

**DRAFT – MASTER PLAN
NORTH SPRINGFIELD LAKE
SPRINGFIELD AND WEATHERSFIELD, VERMONT**

November, 2003



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DRAFT - MASTER PLAN
North Springfield Lake Flood Control Project
Springfield and Weathersfield, Vermont

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1.0 INTRODUCTION

1.1 Project Authorization and Purpose

North Springfield Lake is a unit of the Comprehensive Plan for Flood Control in the Upper Connecticut River Basin. North Springfield Lake was authorized by the Flood Control Act of 1938 (Public Law 761 75th Congress, 3rd Session) as amended by the Flood Control Act of 1941 (Public Law 228, 77th Congress, 1st Session) and the Flood Control Act of 1944 (Public Law 534, 78th Congress, 2nd session). Authorization for the development and use of the reservoir area for public recreational purposes is contained in Section 4 of the Flood Control Act of 1944.

Construction of the North Springfield Lake dam and reservoir began in May 1958 and was completed in November 1960 at a cost of \$6,832,000. The project is one of numerous other projects in the Comprehensive Plan for flood damage reduction and other multiple purposes within the Connecticut River Basin. North Springfield Lake provides flood damage reduction at downstream communities along the Connecticut River in Vermont, New Hampshire, Massachusetts and Connecticut. (Refer to the attached *Figure 1 – Locus Plan.*)

In accordance with Federal Energy Regulatory Commission (FERC) recommendations in the 1940's, approximately 20 percent of the available flood control storage was provided for ultimate hydroelectric power use, but was to be for flood control purposes until such time as power facilities were installed. There is no hydroelectric power installed at the project, nor is any planned for in the near future.

1.2 Purpose and Scope of the Master Plan

This Master Plan for the management of natural resources and outdoor recreation has been prepared in accordance with the objectives and policies governing planning, development and management of these resources for U.S. Army Corps of Engineers (USACE) water resources projects. These objectives and policies are outlined in the following USACE documents:

- ER 1130-2-540 - Environmental Stewardship Operation and Maintenance Policies;
- ER 1130-2-550 - Recreation Operations and Maintenance Policies;
- EP 1130-2-550 - Recreation Operations and Maintenance Guidance and Procedures;
- ER 1165-2-400 - Recreational Planning, Development, and Management Policies;
- USACE Environmental Operating Principles and Implementation Guidance; and
- other related or referenced regulations and policies.

ER 1130-2-540 established the following program objectives for management of a project's natural resources:

- Manage natural resources on USACE administered land and water in accordance with ecosystem management principles to insure their continued availability; and

- Provide a safe and healthful environment for project visitors.

Utilizing this general guidance, ER 1130-2-550 and EP 1130-2-550 provide the specific policy for preparation of project Master plans. Each Master Plan must cover all resources, including, but not limited to fish and wildlife, vegetation, cultural, aesthetic, interpretive, recreational, mineral, commercial and outgranted lands, easements, and water. Based on EP 1130-2-550, the primary goals of the North Springfield Lake Master Plan are to prepare a concept document that prescribes an overall land and water management plan, and establishes resource objectives, and associated design and management concepts, which:

- Provide the best combination of responses to regional needs, resource capabilities and suitabilities, and expressed public desires consistent with authorized project purposes;
- Contribute towards providing a high degree of recreational diversity within the region;
- Emphasize the particular qualities, characteristics and potentials of the project; and
- Exhibit consistency and compatibility with national objectives and other state and regional goals and programs.

ER 1130-2-550 further defines these goals as they relate to recreation management and established the following program objectives:

- Provide a quality outdoor recreation experience which includes an accessible, safe and healthful environment for a diverse population;
- Increase the level of self sufficiency for the USACE recreation program;
- Provide outdoor recreation opportunities on USACE administered land and water on a sustained basis; and
- Optimize the use of leveraged resources to maintain and provide quality public experiences at USACE water resources projects.

1.3 Planning Process

An interdisciplinary study team consisting of staff from the Engineering/Planning and Construction/Operations Divisions of the New England District Corps of Engineers (NAE), and Nobis Engineering, Inc., of Concord, NH, working under contract to NAE, collected, reviewed and analyzed the information contained in this Master Plan. The team included personnel with expertise in the following disciplines:

- planning;
- civil/environmental engineering;
- environmental resources;
- archaeological and cultural resources;
- wetlands and forestry; and
- soils and geology.

Major inputs to the planning process included natural, cultural, and recreational resource inventories and analysis, projections of future needs, and public desires for use of project lands. This information was integrated into project-wide objectives and goals to provide the best use of the federally owned land at North Springfield Lake.

Public input was obtained through public workshops and meetings, and coordination with state, regional and local officials. Two public workshops were held in Springfield and Weathersfield, Vermont, to present the study process, preliminary study results and receive input to obtain public review comments on the draft Master Plan.

The Master Plan is a policy document that serves as an overall management guide for the project while specific management actions are included in the Operational Management Plan (OMP), currently being updated for North Springfield Lake by the USACE. For consistency with the Master Plan, the OMP will be revised to describe, in detail, how the objectives and concepts of the Master Plan will be achieved.

1.4 Reevaluation of the Master Plan

The Master Plan is a flexible planning document that will be periodically reevaluated to be kept current. It will be reviewed on a periodic basis, and will be revised as required. The District Engineer will approve supplements and revisions to the Master Plan.

1.5 Application of Federal Laws

The following laws and regulations provide for the development and management of Federal projects:

1. **Historic Sites, Buildings and Antiquities Act of 1935** (16 U.S.C. 461-467): Known as the Historic Sites Act, this Act declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides for designation, acquisition, administration and protection of such sites. (Additionally, National Historic Landmarks are designated under authority of this Act.)
2. Public Law 78-534 (**The Flood Control Act of 1944**) as amended by the Flood Control Acts of 1946, 1954, 1960 and 1962, authorizes the USACE to construct, operate and maintain public park and recreation facilities at water resource development projects and to permit local interests to construct, operate and maintain such facilities.
3. Public Law 85-624 (**The Fish and Wildlife Coordination Act**) requires that the USACE and any agency impounding, diverting, or controlling water, consult the United States Department of the Interior, Fish and Wildlife Service. The Department of the Interior would

evaluate proposed water resources development measures, and determine potential impacts to wildlife resources and measures needed to prevent such impacts.

4. **Reservoir Salvage Act of 1960** (16 U.S.C. 469 – 469c) This Act is also known as the Archaeological and Historic Data Preservation Act, Archaeological and Historic Preservation Act, “Moss-Bennett Act, and the Archaeological Recovery Act. When enacted in 1960, this law simply authorized the Secretary of the Interior to conduct salvage archaeology in advance of dam and reservoir construction by the USACE and other agencies. In 1974, it was amended comprehensively to authorize salvage in connection with all kinds of Federal, Federally assisted, and federally licensed projects. As amended, it also directs Federal agencies to cooperate with the Department of the Interior in conducting salvage, or to fund such work themselves, and to report to Interior on archaeological programs and any disturbance of archaeological sites.
5. Public Law 86-717 (**Forest Cover Act**, 6 September 1960) provides a statutory mandate for multiple use forest management, or other vegetative cover management, on project lands and waters.
6. Public Law 89-72 (**The Federal Water Project Recreation Act of 1965**), accompanied by House Committee Report No. 254, requires that the USACE and other Federal agencies give full consideration to fish and wildlife enhancement. It also provides for non-Federal participation in land acquisition, and in the development and management of recreational facilities and fish and wildlife resources.
7. Public Law 89-665 (**The National Historic Preservation Act of 1966**), as amended in 1992, directs the USACE and other Federal agencies to provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation.
8. Public Law 91-190 (**The National Environmental Policy Act of 1969**), directs the USACE and other Federal agencies to prepare environmental impact statements or assessments that describe the environmental effects of proposed projects and measures necessary to minimize any adverse effects.
9. Public Law 91-604 (**The Clean Air Act, as amended**), specifies that any Federal activity, which may result in discharge of air pollutants, comply with Federal, state, interstate, and local requirements concerning control and abatement of air pollution.
10. Public Law 93-205 (**The Endangered Species Act of 1973, as amended**) requires Federal agencies to utilize their authorities to carry out programs for conservation of endangered and threatened species protected by the Act.
11. Executive Order 11988 (**Floodplain Management**, 24 May 1977) requires that the USACE and other Federal agencies prevent avoidable adverse or incompatible developments in

floodplains by assessing proposed actions, considering alternative approaches when adverse effects would result, and formulating designs and project modifications to minimize impacts.

12. Executive Order 11990 (**Protection of Wetlands**, 24 May 1977) requires that all Federal agencies take action to minimize destruction, loss or degradation of wetlands. It stipulates that Federal agencies must avoid providing assistance for new construction located in wetlands unless no practicable alternatives exist, and the proposed action includes measures to minimize harm to wetlands.
13. Public Law 95-217 (**Clean Water Act of 1977, as amended**). Section 404 imposes requirements with respect to dredge and fill activities in waterways of the United States, including wetlands. Any fill activities in wetlands must comply with Section 404(b) (1), “Guidelines for the Specification of Disposal Sites for Dredge or Fill Material”. These guidelines allow fill activities for only the least environmentally damaging practicable alternative.
14. Public Law 95-341 (**American Indian Religious Freedom Act of 1978-AIRFA**). This act formalizes a policy whereby Federal agencies will preserve the inherent right of American Indians to express and exercise their traditional religion. These rights include access to sites (which may be on Federal lands), use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. The Act requires agencies to consult with Native American groups, but agencies need not accede to Native American requests.
15. Public Law 96-95 (**Archaeological Resources Protection Act of 1979 - ARPA**). This statute provides protection for archaeological resources by requiring any interested parties to apply for a permit from the controlling Federal agency to excavate, or remove any archaeological resource located on public or Indian lands. The Act also provides for civil and criminal penalties for individuals disturbing or looting sites (including military personnel that allow such actions).
16. Public Law 101-601 (**Native American Graves Protection and Repatriation Act of 1990 - NAGPRA**). This act requires agencies to inventory and repatriate certain Native American cultural items recovered from Federal property to associated Native American groups. These items include human remains, associated funerary objects, sacred objects, and objects of cultural patrimony. The Act describes in detail the items included in these classifications and the procedure for repatriation. The Act also provides for the inadvertent discovery of Native remains and objects. If discovery is related to an activity on Federal land such as construction, logging, agriculture, or other, such activity must cease until proper notification is conducted.
17. **National Register of Historic Places, Nominations by States and Federal Agencies (36 CFR 60)**. These regulations govern the process whereby State and Federal agencies nominate specific resources under their control to the National Register of Historic Places. This is the country’s basic inventory of historic resources and it is maintained by the

Secretary of the Interior. This inventory includes buildings, structures, objects, sites, districts, and archaeological resources that may be significant at the national, state or local level.

18. **Advisory Council on Historic Preservation, Protection of Historic Properties (36 CFR 800).** These are the implementing regulations which govern the Section 106 review process established by the National Historic Preservation Act of 1966, as amended for Federal agencies. These regulations implement procedures for assessing the effects of federally approved, assisted, or funded undertakings on properties which are, or may be eligible for, listing on the National Register of Historic Places.

1.6 USACE Guidance

The Master Plan has been prepared in accordance with guidance contained in the following USACE regulations, pamphlets, and manual:

ER 1130-2-500	Project Operations, Partners and Support, Work Management Policies
ER 1130-2-540	Environmental Stewardship, Operations and Maintenance Policies
ER 1130-2-550	Recreation, Operations and Maintenance Policies
ER 1165-2-400	Recreation Planning, Development and Management Policies
EP 1130-2-500	Project Operations, Partners and Support. Work Management Guidance and Procedures
EP 1130-2-540	Environmental Stewardship, Operations and Maintenance Guidance and Procedures
EP 1130-2-550	Recreation Operations and Maintenance Guidance and Procedures
EM 1110-1-400	Recreation Planning and Design Criteria USACE Environmental Operating Principles and Implementation Guidance

1.7 Reference Documents

The following USACE and State of Vermont reports and documents were reviewed and evaluated as part of this master planning effort:

- Archeological Sampling Locations (Figure E-1), 1981
- “Centennial Geologic Map of Vermont”, Doll, C.G. (Comp. & Ed.), Cady, W.M., Thompson, J.B., Billings, M.P., State of Vermont Geologic Survey, 1961
- Drought Contingency Storage Plan, March 1985
- Drought Contingency Plan, September 1993
- Environmental Assessment Remedial Measures for Seepage Control, North Springfield Dam, May 1985

- Environmental Compliance Assessment Preliminary Findings Reports, July 1997 and August 1993
- Environmental Impact Report on North Springfield Reservoir, March 31, 1973
- Environmental Statement (Final), February 1975
- Fish and Wildlife Management Plan, October 1990
- Fishery Assessment, May 1989
- Floodplain Information - Black River, March 1969
- Forest Management Plan, January 1979
- Geotechnical Report, 10/25/85
- Historic Properties Management Plan – Final, November 2001
- Historic Site Locations (Figure E-4 through E-11), 1981
- Master Plan for Reservoir Development, Black River, May 1961
- Operational Management Plan, 1995
- Physiological Units ranked by Archeological Sensitivity North and South Sections (Figure E-2), 1982
- Project Plan for Recreation Resources Development, 1981
- “Sand and Gravel Resources of Vermont”, Dudley, J. (Comp.), New England Governor’s Council, Inc., Boston MA, 1993
- “Surficial Geologic Map of Vermont”, Doll, C.G. (Comp. & Ed.), Stewart, D.P., MacClintock, P., State of Vermont Geologic Survey, Department of Water Resources, 1970
- VT Recreation Plan, Statewide Comprehensive Outdoor Recreation Plan (SCORP) by the VT Dept. of Forests, Parks and Recreation, January 2000
- Water Resources Development report – Vermont, November 1995
- Water Quality Assessment, 1998
- Water Quality Evaluation, April 1983
- Wetland Map Upper Connecticut River Basin, North Springfield Lake (Sheets 1 and 2 of 2), 1999

2.0 PROJECT DESCRIPTION

2.1 Location

North Springfield Lake is located on the Black River in the towns of Springfield and Weathersfield, Vermont. North Springfield Lake is approximately 8.7 miles upstream of the confluence of the Black and Connecticut Rivers, just northwest of the Village of North Springfield adjacent to the Springfield State Airport. The project consists of about 1,372 acres of fee-owned land, and about 376 acres of flowage easement. The location of the project and its reservoir area are shown on **Figure 1 – Locus Plan**.

2.2 Project Data

North Springfield Lake Dam is a rolled-earth fill embankment with rock slope protection. The outlet works consist of a concrete intake structure that houses three 5-foot by 12-foot slide gates, a gated concrete horseshoe conduit, and a discharge channel. An emergency spillway, cut in rock, is located on the left abutment of the dam, and includes a concrete ogee weir. The project has two permanent impoundments or pools: the “conservation pool” or North Springfield Lake, is located just upstream of the dam structure; and a “recreational pool” called Stoughton Pond, is located approximately three miles upstream of the dam, on the North Branch of the Black River in Weathersfield, Vermont. Stoughton Pond is impounded by the relocated Town Road No. 22, embankment (now Stoughton Pond Road). This embankment was constructed as part of the project to allow continued east/west access at this location. The outlet from Stoughton Pond is a 21-foot wide concrete weir that leads to a circular metal conduit through the embankment.

At its normal elevation (467 feet N.G.V.D.), North Springfield Lake has a maximum depth of 15 feet. Stoughton Pond, normally at an elevation of about 502 feet N.G.V.D., has a maximum depth of about 20 feet. At spillway crest elevation (545.5 feet N.G.V.D.), the flood storage reservoir at the project would encompass 1,200 acres and extend about 4.5 miles upstream of the dam. This reservoir has a storage capacity of 50,200 acre-feet (about 16.6 billion gallons of water), which is equivalent to 5.93 inches of runoff from the contributing 158 square mile drainage area. Pertinent data for the dam and impoundments are summarized in the following table, **Table 1 - North Springfield Lake Pertinent Data** and **Table 2 –Stoughton Pond Road Embankment Pertinent Data**:

**North Springfield Lake Flood Control Project
Springfield and Weathersfield, Vermont**

Table 1 – North Springfield Lake Pertinent Data

Location:	Black River, Springfield, VT
Drainage Area:	158 square miles
Dam Embankment	
Features:	
Type	Rolled earth & rockfill
Length	2,940 feet
Height	120 feet
Top Width	30 feet
Top Elevation (NGVD)	570 feet
Impoundment Features (Normal Conditions):	
Pool Area	75 acres
Maximum Pool Depth	15 feet
Pool Elevation	467 feet
Spillway:	
Type	Conventional side channel with ogee weir
Crest Length	384 feet
Crest Elevation (NGVD)	545.5 feet
Maximum Spillway Discharge Capacity	117,200 cfs
Maximum Conduit Discharge Capacity	8,300 cfs
Reservoir Area	1,260 acres
Intake Channel	
Length	735 feet
Width	20 – 35 feet
Invert Elevation	452 feet msl
Outlet Works:	
Type	horseshoe-shaped concrete conduit
Diameter	12.75 feet
Outlet Pipe Length	659 feet
Pipe Entrance Invert Elevation	452 feet msl
Pipe Exit Invert Elevation	449 feet msl
Capacity @ Spillway Crest	7,700 cfs
Gates	(3) 5' x 12' slide (with hydraulic hoists)
Discharge Channel	
Length	1,500 feet
Width	51 – 60 feet
Stilling Basin Length	200 feet

msl = mean sea level

cfs – cubic feet per second

North Springfield Lake Flood Control Project Springfield and Weathersfield, Vermont <i>Table 2 – Stoughton Pond Road Embankment Pertinent Data</i>	
Location:	North Branch of the Black River, Weathersfield
Dam Embankment Features: Type Length Height Top Width Top Elevation (NGVD)	Rolled earth & rockfill 900 feet 75 feet 28 feet 552 feet
Impoundment Features (Normal Conditions): Pool Area Maximum Pool Depth Pool Elevation	49 acres 20 feet 502 feet (minimum)
Spillway: Type Crest Length Crest Elevation (NGVD)	Broad-crested weir 200 feet 550 feet
Intake Channel:	21-foot wide ogee weir at an elevation of 502.0 feet
Outlet Works: Type Diameter Outlet Pipe Length Pipe Entrance Invert Elevation Pipe Exit Invert Elevation Capacity @ Spillway Crest	Circular corrugated metal pipe 8-foot 300 feet 497 feet 495 feet 1,800 cfs
Discharge Channel: Length Width Stilling Basin Length	65 feet 8 – 24 feet 30 feet

msl = mean sea level

cfs – cubic feet per second

2.2.1 Reservoir Management

2.2.1.1 General:

The overall project is operated and maintained by the New England Division of the USACE. The project is staffed full-time by a Project Manager, and one park ranger, who perform operation and maintenance (O&M) and administrative duties. Additional rangers are usually hired during the summer months. In addition to their primary flood control duties, project staff is also responsible for implementation of this Master Plan through the OMP, visitor assistance, interpretive services, recreation and natural resource management.

2.2.1.2 Operation and Maintenance:

The overall O&M of North Springfield Lake is performed in accordance with the project's OMP, dated 1995, and the O&M Manual dated June 1972. Periodic duties including maintenance, monitoring, inspection, testing, reporting and record keeping requirements are listed in detail in that O&M Manual. Those duties provide for the O&M of the dam and appurtenant facilities, buildings, bridges, utilities, roads, electrical and mechanical equipment and miscellaneous items such as motor vehicles, tools, etc. Specific implementation plans for related programs are contained in other sections of the OMP and include Safety, Security, Visitor Assistance and others.

In addition to inspections and reports required by the OMP and the O&M Manual, periodic inspections are performed by a team of specialists from the Engineering Directorate of the USACE New England District every five years. This constant and overlapping inspection of the dam and appurtenant structures insure that needed maintenance is identified and performed in a timely manner.

2.2.1.3 Flood Control:

Regulation of North Springfield Lake is performed consistent with the Regulation Manual and as directed by the Reservoir Regulation Team (RRT) within the Reservoir Control Center (RCC), at the New England District Headquarters in Concord, Massachusetts. RRT is responsible for regulation of flood control reservoirs. Contact is maintained between RRT and the project office at least once each week and more frequently during flood events. Periodic meetings with RRT are also scheduled throughout each year to discuss regulation and operations.

During regulation events, at least one gate is kept open at least 0.1 foot to provide a minimum release of approximately 15 cfs in order to sustain downstream fish life. The maximum non-damaging discharge, immediately downstream of North Springfield Lake, is approximately 3,500 cfs.

The Project Manager makes weekly radio reports to the RRT concerning local conditions in the areas and at the project itself. Alert reports are made immediately for any of the following conditions:

1. One (1) inch of precipitation in a 24-hour period at the dam or at any precipitation station within the watershed;
2. Whenever a rising pool reaches a stage of 18 feet during either the recreation or non-recreation season;
3. Whenever the Connecticut River at North Walpole reaches a stage of 24.0 feet and is rising; or
4. Unusual local conditions such as difficulty with the gates, ice jams, excessive debris or bridge failures.

During non-flood periods (recreation and no-recreation season), the pool is maintained at a stage of 15 feet by a concrete weir just upstream of the center gate. The two outside gates are closed, and the center gate is fully open.

During flood periods, regulation occurs in three phases:

1. Appraisal of storm and river conditions during development of the flood leading to the initial regulation procedures;
2. Regulation of discharge from the reservoir while the Connecticut River flood flows crest and move downstream; and
3. Emptying the reservoir following the downstream recession of the flood.

Regulation of the reservoir is coordinated with the flood control projects in the Connecticut River Basin to facilitate optimum effectiveness of the entire system.

During recession of a flood on the Black or Connecticut Rivers, the North Springfield Lake reservoir is emptied as rapidly as possible in accordance with the instructions from the RRT. The rate of increase in discharge is not to exceed 500 cubic feet per second (cfs) per hour. The channel capacity in Springfield, Vermont is approximately 5,000 cfs.

Emergency operating procedures (EOP) are available in the event that the Project Manager is unable to communicate with the RRT by normal or emergency methods or in the event of extraordinary flood conditions.

Guidance for the control of flow from the North Springfield Lake dam is summarized in the following ***Table 3 – Outflow Guidance:***

**North Springfield Lake Flood Control Project
Springfield and Weathersfield, Vermont**

*Table 3 – Outflow Guidance
(Drainage Area = 158 sq.mi.)*

		Maximum Outflow	Minimum Outflow Aquatic Base Flow (ABF)			Maximum change in Outflow	
			Oct. – March 160 cfs	April – May 600 cfs	June – Sept. 80 cfs	Increase	Decrease
NORTH SPRINGFIELD LAKE DAM	<i>Flood Control</i>	3,500 cfs	80 cfs			500 cfs/hr to 3,000 cfs then 200 cfs/hr	1,200 cfs/hr
	<i>Daily Operation</i>	NA	160 cfs or inflow whichever is less	600 cfs or inflow whichever is less	80 cfs or inflow whichever is less	160 cfs/hr above 600 cfs and 80 cfs/hr below 600 cfs	
	<i>Maintenance</i>	NA					

NOTES:

1. When storing water to raise the pool to a target level, and inflow is less than the seasonal ABF, maintain outflow to greater than or equal to 70% of inflow, therefore, storing only 30% of inflow.
2. Flood control operations are initiated due to a variety of circumstances. If, however, the pool level rises above 18 ft operating procedures will follow the flood control outflow guidance parameters to whatever extent is necessary.

Existing flood control and flood storage information for North Springfield Lake, are further described in *Section 2.5 – Significant Flood Control Storages*, of this Master Plan.

2.3 Real Estate and Land Use

Total area of the reservoir is about 1760 acres. About 1,372 acres were purchased in fee and about 376 acres are held in flowage easement. Acquisition took place from 1956 to 1959. Construction of the project began in 1958 and was completed in 1960.

There are several easements and land use outgrants associated with the project lands. These frequently are amended or revised. For current real estate and land use outgrant information, contact the project manager.

2.4 Relationship of the Project to Other Projects and Programs

As stated in Section 1.0, North Springfield Lake is located on the Black River and is located approximately 8.5 miles upstream of the Connecticut River confluence. It is one of 16 flood control dams in the comprehensive Connecticut River basin system. The project provides flood damage reduction at downstream communities along the Connecticut River in Vermont, New Hampshire, Massachusetts and Connecticut, and “desynchronizes” flood flows on the Connecticut River.

Other active flood control projects in the Upper Connecticut River basin in Vermont and New Hampshire include:

Ball Mountain Lake	Otter Brook Lake
Townshend Lake	Surry Mountain Lake
North Hartland Lake	Union Village Dam

The Black River originates in the northwestern part of the Black Pond basin in the town of Plymouth, Vermont. The river then follows a southerly course for about 12 miles, of which four miles pass through Echo and Rescue Lakes, to Ludlow, Vermont, where it changes course to an easterly direction for 14 miles. North of Perkinsville, the river takes a southerly course to its mouth where it empties into the headwater pool of the Bellows Falls Power dam on the Connecticut River. The entire length of the river is approximately 39 miles with a uniform drop of 950 feet.

The North Branch of the Black River, located along the northeast section of the watershed, has its origin in South Reading, Vermont, and flows in a southerly direction for approximately 10 miles to its confluence with the main river, about three miles upstream of the North Springfield dam. The North Branch has a fall in elevation of approximately 780 feet.

During flood periods, the RRT at New England District headquarters in Concord, Massachusetts coordinates operation of the 16 Connecticut River projects. The North Springfield Lake dam’s operation is coordinated with the other reservoirs by the RRT to achieve the maximum reduction in flood stages and damages in the Connecticut River basin. Regulation is initiated as a result of heavy rainfall or snowmelt within the basin, and also for specific river states at key locations along the Black and Connecticut Rivers.

2.4.1 Downstream Description

For the purposes of minimizing downstream impacts to riverine resources, scheduled gate changes at the North Springfield Lake dam are coordinated, in advance, with the Vermont Agency of Natural Resources (VTANR) and the local power company. Downstream dams include: Bellows Falls Dam (Bellows Falls, VT) and Vernon Dam (Vernon, VT).

2.5 Significant Flood Control Storages

As presented in *Table 1*, the flood control reservoir at North Springfield Lake covers an area of about 1200 acres at spillway crest elevation (545.5 feet NGVD), and has a storage capacity of about 50,200 acre-feet. For North Springfield Lake, “significant storage” is considered to be any event when more than 9% (pool stage of 32 feet) of the storage capacity is used. According to recorded data, the significant pool stage of 32 feet has been exceeded a total of 47 times, since the dam was placed in operation in 1960.

Historic reservoir significant flood control storages, frequency distribution, and area/capacity information, are summarized in *Table 4 Significant Storage* and *Table 5 – Reservoir Area/Capacity* as follows.

North Springfield Lake Flood Control Project Springfield and Weathersfield, Vermont Table 4 – Significant Storage (1962 – 2002)					
Date	Pool Level (feet)	Storage			
		(Acre-feet)	Utilized Inches	% full	
1987 Apr	85	40300	4.8	81	
1969 Apr	79	34300	4.1	69	
1973 Jul	78	33000	3.9	67	
1984 Jun	76	32030	3.8	65	
1998 April	65	22300	2.5	46	
1977 Mar	64	21420	2.5	43	
2001 April	62	20000	2.4	41	
1996 Jan	62	19800	2.2	40	
1981 Feb	60	18600	2.0	38	
1993 Apr	57	16680	1.7	34	
1976 Apr	54	14600	1.6	29	
1967 Apr	52	13560	1.6	27	
1972 May	52	13250	1.4	27	
1976 Aug	50	12120	1.4	24	
1994 Apr	50	12010	1.4	24	
1983 Dec	49	11810	1.4	24	
1962 Apr	49	11810	1.2	24	
1973 Mar	47	10400	1.2	21	
1964 Apr	45	9750	1.1	20	
1979 Mar	44	9320	1.1	19	
1984 Apr	44	9250	1.0	18	
1980 Apr	43	8720	1.0	18	
1968 Mar	43	8720	1.0	18	
1989 Apr	42	8630	1.0	17	
1982 Apr	42	8450	1.0	17	
1998 June	42	8450	1.0	17	
2000 March	42	8450	1.0	16	
1996 Apr	42	8410	1.0	17	
1990 Mar	42	8320	0.9	17	
1983 Mar	40	7480	0.8	15	
1988 Apr	38	6800	0.8	14	
1975 Oct	38	6760	0.8	14	
1990 Apr	37	6520	0.8	13	
1986 Mar	37	6520	0.8	13	
1978 Jan	37	6480	0.7	13	
1992 Mar	37	6280	0.7	13	
1989 Oct	36	6160	0.7	12	
1996 Jul	36	6040	0.7	12	
1972 Apr	36	6000	0.7	12	
1973 Dec	35	5560	0.6	11	
1964 Mar	34	5280	0.6	10	
1974 Apr	33	4960	0.6	10	
1996 May	33	4920	0.6	10	
1977 Apr	33	4760	0.6	10	
1987 Oct	33	4680	0.5	9	
1995 Oct	32	4520	0.5	9	
1979 May	32	4520	0.5	9	
2001 June	32	4442	0.5	9	

Spillway crest = 93.5 feet; Storage = 50,000 acre-feet

North Springfield Lake Dam Flood Control Project Springfield and Weathersfield, Vermont					
Table 5 – Reservoir Area/Capacity (Drainage Area = 158 square miles)					
Elevation (feet – NGVD)	Stage (feet)	Area (acres)	Capacity		% Full
			(acre-feet)	(inches)	
452	0.0 = GATE INVERT				
467	15	100	500	0.06	
NORMAL POOL = 15 FEET (START OF FLOOD CONTROL STORAGE)					
467	15	100	0	0.0	0
475	23	290	1500	0.2	3
479	27	360	2650	0.3	5
485	33	420	4800	0.6	10
487	35	440	5600	0.7	11
489	37	455	6400	0.8	13
491	39	470	7200	0.8	14
493	41	490	8000	0.9	16
497	43	495	8900	1.1	18
501	49	550	11700	1.4	23
505	53	595	14000	1.7	28
509	57	650	16500	2.0	33
515	63	720	20700	2.5	41
517	65	745	22300	2.6	45
519	67	770	24000	2.8	48
521	69	795	25600	3.0	51
523	71	820	27200	3.2	54
525	73	850	29000	3.4	58
527	75	880	30600	3.6	61
529	77	910	32500	3.9	65
531	79	945	34500	4.1	69
533	81	980	36100	4.3	72
535	93	1020	38100	4.5	76
537	85	1060	40100	4.8	80
539	87	1095	42100	5.0	84
541	89	1125	44200	5.2	88
543	91	1160	46200	5.5	92
545.5	93	1200	50000	5.9	100
SPILLWAY CREST 93 FEET					
547	95	1220	51200	6.1	102
549	97	1250	54000	6.4	108
551	99	1280	57000	6.8	114
TOP OF DAM = 118 FEET					
1 – INCH RUNOFF = 8,425 ACRE – FEET					

2.6 History

2.6.1 Prehistoric Period

Prehistoric settlement and land use patterns of the Springfield and Weathersfield section of the Black River drainage basin appear to be similar to those found throughout the Upper Connecticut River drainage basin are characterized as limited use of upland areas and more intensive use of terraces above navigable streams and river mouths. Subsistence was biased towards hunting, fishing, and foraging. The typical village/settlement sites established during this period, throughout this entire region, include residence at the lower reaches of all major rivers during summer period and a return to upland sites during other periods. This is the most common settlement pattern during the prehistoric period in Vermont. All sections of this drainage may have been part of the same settlement pattern at some time during this period.

According to reviewed data, no specific sites of prehistoric significance have been found within the North Springfield Lake project area.

2.6.2 Historic Period

Just prior to European settlement, the Black River Valley was a major route used by Abnaki, Pennacook, and Pocumtuck Indians. During the mid-18th century the trail was used by settlers and became the major route to Quebec. In 1759 a formal military road was constructed along this route and became known as Crown Point Road. This road passes through the northern section of the project and has been placed on the National Historic Register of Historic Places as the roadway retains its 18th century character within the project limits.

Crown Point Road served to stimulate the settlements of Springfield and Weathersfield. In 1774 the first settlers occupied Springfield and in 1769 the first settlers of Weathersfield arrived. Foreign inhabitants began populating the area in the late 1700's, with the majority working farms and cutting timber. By the early 1800's, shops and mills (saw, grist, and woolen) flourished and employed large numbers of local people.

During the majority of the 19th century, Springfield was an industrial center supporting various mills, factories, and shops. Outside the industrial center, dispersed farms dominated Springfield's development, with croplands in the broader valley bottoms and dairy farms in the steeper areas.

Weathersfield experienced its greatest period of growth from 1780 to 1830, when salable agricultural surpluses and the Connecticut River traffic supported a growing population. From 1820 to 1900, agricultural activities were supplemented by a number of small industrial concerns

that primarily processed locally available raw materials, including wool, soapstone, lumber, and lime.

Most of the manufacturers had ceased operations by 1880; subsequently, Springfield mainly supported a rural farming community with dispersed farmsteads and small villages. However, several of the larger machine tool factories still continued operations during this period. In Weathersfield, the industrial activity declined, but agriculture still supported only a small percentage of the population. There was only one industrial enterprise remaining in Weathersfield by the end of the 19th century; the Vermont Soapstone Company. Therefore, many of the town's residents were employed in manufacturing outside Weathersfield, working in the Springfield machine tool industry.

Today, although Springfield is an industrial town, many of the surrounding communities have developed economies supplemented by tourism with summer camps for children and adults throughout the area. This trend began in the 1950s as the interstate system was being built in the United States and culminated eventually with the construction of Interstate 91 through Vermont. With highway travel made easier between communities, and the population in central Vermont increasing dramatically in the last 25 years, the demand for recreational opportunities has continued to grow.

2.7 Climate

2.7.1 General

The Black River Basin has a variable climate characterized by frequent short periods of heavy precipitation. Winds are predominantly from the west bringing occasional cyclonic disturbances that cross the county from the west or southwest, providing frequent weather changes. The area is also subjected to coastal storms, occasionally of tropical origin, that travel up the Atlantic seaboard.

2.7.2 Temperature

Winters are moderately severe with sub-zero temperatures being common. Summers are mild with temperatures over 90°F occurring infrequently. The average annual temperature is 53°F. Throughout the year average monthly temperatures vary widely from 18°F in January to 68°F in July. Temperature extremes range from occasional highs slightly above 100°F to infrequent lows in the minus 40's. The average frost-free period is about 112 days.

2.7.3 Precipitation

Precipitation is fairly well distributed throughout the year and amounts to approximately 40 inches, annually. Monthly rainfall has ranged from a minimum recorded value of 0.0 inches in

March to a maximum of 11.30 inches in July. The annual mean snowfall for the middle of the Black River Basin is 84.2 inches with about 50 percent occurring in January and February.

Maximum water content of snow occurs about the middle of March and averages about 6.5 inches with a recorded maximum of 10.8 inches and a minimum of 3.7 inches. As a result of melting snow, springtime runoff is frequently moderately high, but snowmelt runoff alone has not been sufficient to cause a flood. However, a combination of heavy rain and snowmelt could cause serious flooding.

Annual runoff averages 23.58 inches with a recorded range of 10.29 inches in 1965 to 36.40 inches in 1960. The mean annual runoff represents about 60 percent of the mean annual precipitation. During the months of March, April, and May about 60 percent of the mean annual runoff occurs. The recorded discharges of the Black River at the North Springfield gage (158 square miles drainage area) have varied from a peak of 15,500 cfs in September 1938 to a minimum of 8 cfs in July 1962. The annual average is 274 cfs.

2.8 Topography

The Black River watershed drains in a generally southeasterly direction. It is approximately 22 miles long and 12 miles wide with a total drainage area of 204 square miles. About 158 square miles are situated upstream of the North Springfield Dam. Elevations vary from 3,700 feet mean sea level (msl) at the headwaters to 280 feet msl at the river's confluence with the Connecticut River. There are a few ponds near the northern headwaters, but the watershed is generally conducive to rapid runoff. (Refer to *Figure 1 – Locus Plan* and attached *Figure 2 – Site Plan*.)

The reservoir area itself is generally steep, and includes wooded hillsides with predominantly easterly and westerly exposures. A fairly large amount of land in the valley bottom is gently rolling fields. Elevations within the reservoir range from approximately 1,000 feet msl at the tops of the ridges to about 450 feet msl at the dam site.

2.9 Project Access

2.9.1 Roadways

The North Springfield Lake main dam is located one-half mile off Route 106 along Reservoir Road in Springfield, Vermont.

The access to the nature area and the Girl Scouts' camping facility/nature trail are located off Reservoir Road approximately one-quarter mile north of the main dam.

The Stoughton Pond Recreation Area is situated in Weathersfield, Vermont on Stoughton Pond Road one-half mile from its junction with Route 106.

The reservoir's west access area can be found by traveling eastward on Maple Street in Perkinsville for three-quarters of a mile after leaving Route 106.

2.9.2 Parking

Both developed and undeveloped parking areas of various types and numerous locations are available at most recreation areas within the project. Vehicle parking is not allowed on the recreation area lawns.

2.9.3 Trails

Many multi-use trails have been established throughout the project area with the primary uses being hiking, biking, equestrian, and snowmobiling. The snowmobile trails are connected into a larger system of trails on private land abutting the project.

Of particular significance, is the "Springweather Nature Area Self-Guiding Trail" system that is located on the easterly side of the North Springfield Lake reservoir area. This trail system overlooks the lake, and has been developed by the Ascutney Mountain Audubon Society through a lease and in cooperation with the USACE. Access to the area and main parking lot is from Reservoir Road. There are three major, marked trails – the "Blue", "Red" and "Green" trails.

2.9.4 Water

The North Springfield Lake impoundment is maintained as a conservation pool for recreational and wildlife management purposes. The Stoughton Pond covers approximately 50 acres and is also for recreational and wildlife management purposes.

The Vermont Water Resources Board conducted hearings in 1966 and classified the waters of the Black River and its tributaries. The majority of the watershed is Class B ("suitable for bathing and recreation, irrigation and agricultural uses; good fish habitat; good aesthetic value; acceptable for public water supply with filtration and disinfection"). Portions of the river, from Ludlow to Perkinsville, and from North Springfield to its confluence with the Connecticut River, are designated as Class C ("suitable for recreational boating, irrigation of crops not used for consumption without cooking; habitat for wildlife and for common food and game fishes indigenous to the region; and such industrial uses as are consistent with other Class C" uses).

3.0 RESOURCE INVENTORIES

3.1 Introduction

North Springfield Lake is a regionally important and valuable natural resource that provides for many popular recreational activities such as: hiking, hunting, fishing, swimming, picnicking, and canoeing. The project maintains a wide variety of habitats through wildlife and forestry management programs that are oriented toward conservation and passive recreation.

The project area consists of a total of about 1,372 acres owned in fee and about 376 acres in additional flowage easement. At spillway crest, flood storage would cover about 1,200 acres. All lands are under the jurisdiction of the Army Corps of Engineers. Of the 1,372 acres, 39 percent (537 acres) are forested, less than one percent (11 acres) is forested wetlands, and 28 percent (385 acres) are non-forested wetlands. The remainder of the project area consists of open areas and areas that are developed for recreational use and roadways.

3.2 Natural Resources

3.2.1 Geology

3.2.1.1 Bedrock Geology:

East-central Vermont bedrock geology consists primarily of metamorphic rock ranging in age from Lower Devonian (395± million years before present) to Pre-Cambrian (greater than 590± million years before present). Based on the Geologic Map of Vermont, bedrock in the vicinity of North Springfield Lake generally consists of:

- Lower Cambrian quartz-plagioclase-microcline-biotite gneiss of the Bull Hill member of the Cavendish Formation.
- Lower Cambrian dolomite of the Cavendish Formation.
- Pre-Cambrian biotitic gneiss of the Mount Holly Complex.

The North Springfield Dam is located within the Pre-Cambrian gneiss. Structurally the dam and reservoir are located in the Chester Dome anticline.

3.2.1.2 Surficial Geology:

Surficial geologic deposits in the vicinity of North Springfield Lake are primarily the result of deposition that occurred during the retreat of the Laurentide ice sheet 12,000± years before present and recent post-retreat deposition. Based on the Surficial Geologic map of Vermont the surficial deposits in the study area consist of:

- Glaciolacustrine littoral (beach) sands and delta sands.
- Glacial till (generally dense undifferentiated silt to gravel)
- Post glacial fluvial and recent alluvial sand and gravel.
- Post-glacial swamp, peat, and muck deposits.

3.2.1.2.1 Surficial Geologic Resources:

The surficial deposits described above constitute geologic resources in some areas. Based on the Sand and Gravel Resource Maps of Vermont, the following information is provided:

- Sand Deposits – deposits of stratified and sorted fine to very coarse sand.
- Sand and Gravel Deposits – deposits of stratified and sorted boulder to pebble gravel and sand and gravel deposits of interbedded cobble to pebble gravel and medium to coarse sand.
- Land Use Exclusion Areas – areas where deposits are assumed to be unavailable due to development, critical habitat, or land use restrictions.

3.2.2 Soils

Soil mapping information for the project is shown on attached **Figure 3 – Soil Classification Plan**. Quantities by soil type are compiled into the following **Table 6 – Soil Types Listed by Acreage**:

**North Springfield Lake Dam Flood Control Project
Springfield and Weathersfield, Vermont**

Table 6 – Soil Types Listed by Acreage

Map Symbol	Soil Type	Total Acreage
17&18-	Peru-Skerry-Colonel Complex*	119.7
19-	Vershire-Dummerston Complex	39.5
54-	Tunbridge-Lyman Complex	33.5
58-	Berkshire-Tunbridge Complex	25.1
20-	Glover-Vershire Complex	22.4
68-	Berkshire And Monadnock Fine Sandy Loam	17.0
22-	Shelburne Fine Sandy Loam	16.0
42-	Lyman-Rock Outcrop Complex	14.9
11-	Marlow Fine Sandy Loam	11.4
25-	Buckland Loam	7.9
24	Podunk Fine Sandy Loam	5.7
71-	Croghan And Sheepscot Fine Sandy Loams	5.5
75-	Urban Land-Colton-Croghan Complex	4.4
70-	Adams Loamy Fine Sand	3.6
31-	Cabot Loam	3.4
64-	Colton Fine Sandy Loam	3.0
29-	Grange Very Fine Sandy Loam	2.5
48	Pits, Sand And Pits, Gravel	1.9
41-	Saco Silt Loam	1.8
47-	Pondicherry And Wonsqueak Mucks	1.3
33-	Rumney Fine Sandy Loam	1.1
<p><i>* Note: Most of this soil type lies beneath North Springfield Lake and is not subject to surficial erosion.</i></p>		

3.2.2.1 Detailed Soil Descriptions:

Detailed soils descriptions for the dominant soil types were obtained from the USDA Natural Resources Conservation Service (NRCS) office in White River Junction, Vermont. The following soil descriptions are excerpted from the Windsor County, Vermont USDA Soil Conservation Service fact sheets:

Peru, Skerry, and Colonel Soils:

These soils formed in loamy, compact glacial till on uplands. Peru Soils and Skerry Soils are both very deep to bedrock, shallow to moderately to dense basal and moderately well drained. They have a perched water table at depths of 1.5 to 2.5 feet below the surface from late Fall through late spring. Permeability is moderate in the solum and moderately slow to slow in the substratum. Colonel Soils are very deep to bedrock, shallow to moderately deep to dense basal till and somewhat poorly drained. These soils have a perched water table at depths of 1.0 to 2.0 feet below the surface from Fall through late Spring. Permeability is moderate in the solum and moderately slow or slow in the substratum. This map unit is well suited to cultivated crops, hay and pasture. ***Erosion is a hazard.*** A seasonal high water table may inhibit the establishment of some crops.

Vershire-Dummerston Complex:

These soils formed in loamy glacial till on bedrock-controlled uplands. Vershire Soils are moderately deep to bedrock and well drained. Permeability is moderate. Dummerston Soils are very deep to bedrock and well drained. Permeability is moderate. This map unit is well suited to cultivated crops, hay and pasture. ***Erosion is a hazard.*** This map unit is composed of complexes of one or more soils underlain by bedrock and bedrock outcrops. The shallowest soil component has bedrock at 20 to 40 inches.

Tunbridge-Lyman Complex:

These soils formed in loamy glacial till on uplands. Tunbridge Soils are moderately deep to bedrock and well drained. Permeability is moderate or moderately rapid. Lyman Soils are shallow to bedrock and somewhat excessively drained and permeability is moderately rapid. This map unit is poorly suited to cultivated crops, hay and pasture because of the stones and boulders on the surface and the rock outcrops. This map unit is a complex of soils of varying depths to bedrock.

Berkshire-Tunbridge Complex:

These soils formed in loamy glacial till on uplands. Tunbridge Soils are moderately deep to bedrock and well drained. Permeability is moderate or moderately rapid. Berkshire Soils are very deep to bedrock and well drained. Permeability is moderate or moderately rapid. This map unit is poorly suited to cultivate crops, hay and pasture because of the stones and boulders on the surface and rock outcrops. This map unit is composed of complexes of one or more soils underlain by bedrock and bedrock outcrops.

Glover-Vershire Complex:

These soils formed in loamy glacial till on uplands. Glover Soils are shallow to bedrock and somewhat excessively drained. Permeability is moderate. Vershire Soils are moderately deep to bedrock and well drained. Permeability is moderate. This map unit is suited to cultivated crops, hay and pasture. Stones and boulders on the surface and rock outcrops are troublesome in tillage and harvesting operations but in most cases do not prohibit use.

3.2.2.2 Summary:

Most of the areas with highly erodable soils at North Springfield Lake are located under the normal pool of North Springfield Lake and therefore not susceptible to surficial erosion. Other areas with highly erodable soils lie in the vicinity of the boat ramp and along the east shore of the Black River, near Reservoir Basin Road. Current management practices assure ample vegetative cover and slope stability.

The predominantly sandy soil on steep slopes bordering the pools is a significant factor contributing to soil slumps at the project. Impoundments resulting from reservoir operations have caused many soil slumps due to the soil aggregate becoming saturated and greatly increasing in weight, resulting in a loss of cohesion between the surface horizon and the subsoil during filling, impoundment, or draw down of floodwaters. These soil slumps result in a loss of forest cover and habitat, increase the siltation in the lakes and river. The slumps are also a significant source of sediment deposits which lead to emergent marsh and shrub scrub habitat encroachment into open water pools.

3.2.3 Surface Waters and Wetlands

In the 1970's, the North Springfield Lake Reservoir covered approximately 100 acres at elevation 467 feet msl, with approximately 20 acres of marshland in adjacent areas. Today, due to soil slumps and sedimentation from upstream sources, the conservation pool behind the main dam has been reduced to approximately 69 acres at elevation 467 feet msl. In the 1970's the recreation pool of Stoughton Pond covered approximately 65 acres at elevation 502 feet msl. Today, the recreation pool of Stoughton Pond covers approximately 44 acres at elevation 502 feet msl. Meanwhile, marshland and scrub/shrub wetlands adjacent to the main pool have increased by approximately 52 acres.

Wetlands at the project were classified in accordance with the Cowardin et. al. Classification system, as follows:

- Palustrine - all non-tidal wetlands dominated by trees, shrubs, and persistent emergent herbaceous plants.
- Lacustrine - generally areas of open water greater than 20 acres or more than 6.6 feet in depth.
- Riverine - generally all wetlands and deepwater habitats contained within a channel.

Wetland mapping and land habitat information for the project is shown on attached ***Figure 4 – Habitat Classification Plan.***

The palustrine wetland acreages are summarized in the following *Table 7 – Palustrine Wetlands Acreages*:

North Springfield Lake Flood Control Project Springfield and Weathersfield, Vermont <i>Table 7 – Palustrine Wetlands Acreages</i>	
Vegetation Type	Total Acres
Aquatic bed vegetation, rooted vascular	6
Emergent vegetation, persistent	66
Emergent vegetation, non-persistent	8
Shrub/scrub broad-leaved deciduous	124
Forested broad-leaved deciduous	11
Total =	215

Lacustrine system habitat at the project totals 113 acres, which are primarily located within North Springfield Lake (69 acres) and Stoughton Pond (44 acres). The narrow shallow areas of the Black River and the North Branch of the Black River were classified as riverine, and total approximately 58 acres.

3.2.4 Vegetative Cover

3.2.4.1 Forest Lands:

The lands and forests of North Springfield Lake are valuable assets to the surrounding areas providing recreational opportunities and preserving natural areas in public ownership as well as protecting the lakes and streams within the flood control project. The forested lands protect the lands surrounding the lakes from erosion, provide recreational opportunities and aesthetics, and increase wildlife habitat diversity. The wise management of these lands and forests according to sound ecological practices will insure their existence for future generations and their continued productivity.

The forested lands at North Springfield Lake are primarily noncommercial. This is due to the generally steep terrain and small area of stands. Most of the forest stands are located in areas that are too steep to farm, are between fields, or are too boggy for cultivation. Consequently, these areas remain in forest cover.

USACE staff conducted a “timber cruise” at North Springfield Lake during the summer of 1976. Species composition and general cover types were noted along with estimates of average volume per acre by species. The total acreages of the forest cover types for the project area are shown below, in ***Table 8 – Forest Cover Acreages***, and are depicted on attached ***Figure 5 – Forest Classification Plan***. As can be seen, open to brushy areas, white pine, hemlock, and white pine are the dominant forest cover types at North Springfield Lake:

North Springfield Lake Flood Control Project Springfield and Weathersfield, Vermont <i>Table 8 – Forest Cover Acreages</i>	
Forest Cover Type	Total Acres
open to brushy areas	437
white pine	169
hemlock	145
sugar maple-beech-yellow birch	53
white pine-N. red oak-white ash	35
white pine-hemlock	30
paper birch	22
grey birch/red maple	19
white pine plantation	19
sugar maple	12
red pine plantation	10
aspen	7
scotch pine-white pine plantation	6
sugar maple-basswood	5
N. red oak-basswood-white ash	3
no cover type available	33
Total =	1,005

Open or brushy areas were not inventoried as forested lands, but were included on the cover type maps because they represent the largest single category of ground cover into which a large portion of the project land fell.

These open, brushy areas generally consist of small intolerant hardwoods like grey birch and aspen (*Populus tremuloides*) with Eastern white pine (*Pinus strobus*) or red maple (*Acer rubrum*), blue beech (*Carpinus caroliniana*), and shrubby plants such as spirea in association. These areas were often ecotones between forested lands and open land, swamps, areas of poor soil types, or floodplain areas.

The most common forest type found was Eastern white pine. Found in plantations in some places on the project, it occurs with red pine (*P. resinosa*), scotch pine (*P. sylvestris*) and Norway spruce (*Picea abies*). Pure stands occur in a few locations with the remaining areas made up of white pine and associated species similar to the hemlock type.

The second most frequently encountered forest cover type found at North Springfield Lake was Eastern hemlock (*Tsuga canadensis*) with commonly associated species. This type was found on hills or ridges away from areas prone to flooding. Associated species found occurring with Eastern hemlock included black and yellow birch (*Betula alleghaniensis*), red and sugar maple (*A. saccharum*), Northern red oak (*Quercus rubra*), basswood (*Tilia americana*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), American beech (*Fagus grandifolia*), and Eastern white pine. The composition of the associated species varies depending on crown closure, soil moisture content, slope and aspect, past history and other factors.

The last major forest type was typical northern hardwoods. American beech, sugar maple, and yellow birch. Presently this cover type is in transition due to the infestation of the beech bark disease. Very few beeches can be found which do not exhibit symptoms of the disease.

Excluding plantations and pure stands of white birch (*B. papyrifera*) or aspen, 10 additional forest cover types were identified. Most are variations of the predominant three types resulting from varying percentages of the associated species.

The overall quality of the forestry growing stock is fair to medium. The forest management program includes practices for wildlife habitat improvement, including limiting fragmentation of the forest. The forest is managed for a variety of age classes of trees to insure continuous supplies of food and shelter for wildlife.

The majority of the forest contains early successional species, and is generally 40-60 years in age. Over time, the white pine, poplar, and red maple will be naturally replaced by later successional species.

Reproduction was generally good with major species being white ash, white pine, red and sugar maple, red oak, basswood, and hemlock depending on the site. Ground cover consisted of forest litter with Canadian Mayflower (*Maianthemum canadense*), various mosses, and ferns forming the

herbaceous component. Except in areas of severe erosion, an adequate duff layer is present to retain moisture and protect the mineral soil. Average depth is approximately 1 inch, but varies from nearly zero to 2 1/2 inches.

3.2.4.2 Open Lands (Grass and Brushy Areas):

Open lands found at the project are associated primarily with project administration areas or occur as former agricultural fields. The areas around the administration facilities are maintained as lawn except for small areas of pavement. The greatest extent of open lands is located in the reservoir proper. Where practicable, these are maintained by leasing the haying rights to farmers or mowed by contractors on an annual basis. Open areas make up approximately 437 acres or 31 percent of the project area. Former agricultural fields are maintained in early successional growth through the mowing program, or through new agricultural leases, which also provides open areas.

3.2.4.3 Developed Areas:

One developed recreation area exists at North Springfield Lake. It is the swimming and picnic area on the west shore of Stoughton Pond. The boat ramp at the upper end of the main pool and one boat launch ramp at Stoughton Pond provide access to the waters of North Springfield Lake. The balance of the reservoir is open to hiking, nature observation, and a variety of other recreational activities that are not directly dependent on developed facilities. Snowmobile trails are interspersed throughout the forested and open areas of the reservoir.

3.2.4.4 Exemplary Natural Communities:

Exemplary natural communities are identified by the Vermont Nongame and Natural Heritage Program and the US Fish and Wildlife Service. Per correspondence with this agency, no natural communities of statewide significance have been identified at the project.

3.2.5 Wildlife

Wildlife species that can be found in the project area include muskrat, fisher, raccoon, beaver, mink, red fox, whitetail deer, various species of rabbit, and wild turkeys. A variety of avian species including wood duck, black duck, common snipe, Canada geese, common snipe, ruffed grouse, American woodcock, and various songbirds can also be found within the project boundaries. A wide variety of amphibians and reptiles are found including various salamander, frog, toad, snake, and turtle species. The following are some of the wildlife species that have been observed at North Springfield Lake dam:

- black-capped chickadee (*Parus atricapillus*);
- broad-winged hawk (*Buteo p. platypterus*);
- eastern bluebird (*Sialia sialis*);

- eastern chipmunk (*Tamias striatus*);
- eastern gray squirrel (*Sciurus carolinensis*);
- fisher (*Martes pennanti*);
- gray fox (*Urocyon cinereoargenteus*);
- kestrel (*Falco sparverius*);
- New England cottontail (*Sylvilagus transitionalis*);
- raccoon (*Procyon lotor*);
- red fox (*Vulpes fulva*);
- red squirrel (*Tamiasciurus hudsonicus*);
- red-tailed hawk (*Buteo jamaicensis*);
- ruffed grouse (*Bonasa umbellus*);
- snowshoe hare (*Lepus americanus*);
- tree swallow (*Iridoprocne bicolor*);
- whitetail deer (*Odocoileus virginianus*);
- wild turkey (*Meleagris gallopavo*);
- woodcock (*Philohela minor*);
- muskrat (*Ondatra zibethica*);
- beaver (*Castor canadensis*);
- mink (*Mustela vison*);
- otter (*Lutra Canadensis*);
- common loon (*Gavia immer*);
- black duck (*Anas rubripes*);
- wood duck (*Aix sponsa*);
- Canada goose (*Branta canadensis*);
- pied-billed grebe (*Podilymbus p. podiceps*);
- great blue heron (*Ardea herodias*);
- green heron (*Butorides v. virescens*);
- American goldeneye (*Bucephala clangula*);
- killdeer (*Charadrius v. vociferous*);
- mallard (*Anas p. platyrhynchos*);
- green-winged teal (*Anas carolinensis*);
- American merganser (*Mergus merganser americanus*);
- spotted sandpiper (*Agelaius phoeniceus*);
- eastern belted kingfisher (*Megasceryle a. alcyon*);
- bufflehead (*Bucephala albeola*);
- pintail (*Anas acuta*);
- American bittern (*Botaurus lentiginosus*);
- blue-winged teal (*Anas discors*);
- snow goose (*Chen hyperborean*);
- ring-necked duck (*Agthya collaris*);
- common gallinule (*Gallinula chloropus*);

- solitary sandpiper (*Tringa solitaria*); and
- lesser yellow-legs (*Totanus flavipes*).

Primary terrestrial wildlife requirements are food, water, and shelter in adequate quantity and quality. Many species also need escape cover to elude predators. Several species have rather specific habitat requirements for breeding and propagation. Some examples are drumming sites for ruffed grouse, suitable den trees for raccoons or pileated woodpeckers, and flood-proof and relatively predator proof nesting sites for waterfowl. Each particular species must find all of its daily needs within the immediate range of its daily activity patterns. In general, the greater the interspersed cover types providing the basic needs, the better the habitat for that species.

The majority of the wildlife habitat improvement practices at the North Springfield project area are carried out under the forest management program. The forest is managed to insure food and shelter for wildlife by improving the amount, quality and distribution of food and cover. Management of a combination of open areas, seedling, saplings, brush, and mature forest provides for distribution of cover types to meet wildlife needs.

Open fields in primary succession stage provide a diversity of habitats for wildlife, as contributing to the project's aesthetics and overall environmental quality. There is a need for open grassland in the New England area as many potential open space zones are being lost to woody growth. Existing open areas are being maintained through mowing and prescribed burning. There are currently two leases at North Springfield Lake for agricultural purposes.

3.2.6 Fish

The North Springfield project area supports various aquatic habitats, including warm water fisheries in Stoughton Pond, warm and cold-water fisheries in North Springfield Lake, and cold-water fisheries in the Black River and the North Branch of the Black River. Various wetlands associated with these water bodies are found throughout the project area.

The waters of the Black River and North Branch of the Black River upstream of North Springfield Lake are designated a cold-water fishery by the Vermont Water Quality Standards, April 21, 1997. These areas were investigated in 1991 as part of the fisheries investigation for North Springfield Lake and appear to be a fairly good warm-water fishery.

The fish species currently found in the project area include both warm and cold-water species, including:

- longnose sucker (*Catostomus catostomus*);
- chain pickerel (*Esox niger*);
- brown bullhead (*Ictalurus nebulosus*);
- yellow perch (*Perca flavescens*);
- golden shiner (*Notemigonus crysoleucas*);
- sunfish (*Lepomis* spp.);

- white sucker (*Catostomus commersoni*);
- fallfish (*Semotilus corporalis*);
- pumpkinseed (*Lepomis gibbosus*);
- rock bass (*Ambloplites rupestris*);
- spottail shiner (*Notropis hudsonius*);
- largemouth bass (*Micropterus salmoides*);
- common shiner (*Notropis cornutus*);
- creek chub (*Semotilus atromaculatus*);
- rainbow trout (*Salmo gairdneri*);
- brook trout (*Salvelinus fontinalis*);
- smallmouth bass (*Micropterus dolomieu*); and
- brown trout (*Salmo trutta*).

Extensive fishing occurs at all portions of North Springfield Lake. Currently, a Vermont Department of Fish and Wildlife program stocks approximately 3,000-4,000 spring yearling rainbow trout into Stoughton Pond annually.

Water level fluctuations occur at the project site for purposes of flood control regulation. These fluctuations can be both beneficial and detrimental to fish species with the extent of the damage depending on many factors. These include the time of year, the amount of fluctuation, and the direction of fluctuation (a raising or a lowering of the pool level).

3.2.7 Rare, Threatened and Endangered Species

Per correspondence with the Vermont Nongame and Natural Heritage Program and the US Fish and Wildlife Service relative to state and federal listings of threatened and endangered species found at the project site, the following species of plants are listed for North Springfield Lake:

<u>Common Name</u>	<u>Scientific Name</u>	<u>Federal Status</u>	<u>State Rank</u>	<u>Global Rank</u>	<u>Comments</u>
Scirpus purshianus	Pursh's bulrush	G4G5	S2S3		Last Seen 1998
Carex argyrantha	Hay sedge	G5	S2		Last Seen 1998
Trillium cernuum	Nodding trillium	G5	S2		Last Seen 2000

North Springfield Lake personnel have also found the following species of rare and uncommon native birds at the site, as listed October 2000 on the Vermont Fish and Wildlife Department website:

<u>Common Name</u>	<u>Scientific Name</u>	<u>Federal Status</u>	<u>State Status</u>	<u>State Rank</u>	<u>Global Rank</u>
wood turtle	Clemmys insculpta		SC	S3	G4
Northern long-eared bat	Myotis septentrionalis			S3	G4
common loon	Gavia immer		E	S2B,S4N	G5
pied-billed grebe	Podilymbus podiceps		SC	S2B,S3N	G5
great blue heron	Ardea herodias			S2S3B,S5N	G5
green-winged teal	Anas crecca			S2B,S5N	G5
Northern pintail	Anas acuta			S1B,S5N	G5
turkey vulture	Cathartes aura			S3B,S4N	G5
osprey	Pandion haliaetus		E	S2B,S4N	G5
bald eagle	Haliaeetus leucocephalus	LE	E	SHB,S2N	G4
Northern harrier	Circus cyaneus		SC	S2B,S3S4N	G5
cooper's hawk	Accipiter cooperii		SC	S2S3B,SZN	G5
merlin	Falco columbarius			S1BSZN	G5
blue-gray gnatcatcher	Polioptila caerulea			S3B,SZN	G5
pine warbler	Dendroica pinus			S3B,SZN	G5
grasshopper sparrow	Ammodramus savannarum		T	S2B,SZN	G5

KEY:

- E: Endangered: in immediate danger of becoming extirpated in the state*
SC: Special Concern: rare; status should be watched
LE: Listed endangered
T: Threatened
S1: Very rare, generally 1 to 5 occurrences believed to be extant and/or some factor(s) making it especially vulnerable to extirpation from the state
S2: Rare, generally 6 to 20 occurrences believed to be extant and/or some factor(s) making it vulnerable to extirpation in the state
S3: Uncommon, believed to be more than 20 occurrences and/or there is some threat to it in the state
S4: Apparently secure in state, often with more than 100 occurrences
S5: Demonstrably secure in state
SZ: Not of practical conservation concern because there are no definable occurrences
B: Breeding status e.g. S1B is a very rare breeder
N: Nonbreeding status e.g. S1N is a very rare nonbreeder; and SZN is a migrant that occurs in an irregular, transitory, and/or dispersed manner
G4: Apparently secure globally, though perhaps locally rare
G5: Demonstrably secure globally

3.2.8 Water Quality

The North Springfield Lake watershed is relatively rural and undeveloped. Tillable land is generally scarce in the area and agricultural activity is primarily restricted to dairying and the production of poultry and eggs. Hay is the principal field crop.

USACE flood control projects are classified into three categories based on water quality conditions. Simply stated, Class I projects have high water quality, Class II projects have minor or suspected water quality problems, and Class III projects experience continuing water quality problems. These classifications are used to prioritize the frequency and intensity of water quality monitoring activities. North Springfield Lake is a Class I project.

As a Class I USACE project with a conservation pool, low level (fixed-station, i.e. confined to certain stations considered representative of water quality at the project as a whole) monitoring is conducted at North Springfield Lake about every 3 years.

3.2.8.1 Water Quality Monitoring:

Water quality activities at North Springfield Lake and Stoughton Pond primarily involve baseline beach and potable water monitoring at the recreation area. There are five main water quality stations presently being monitored by the USACE at the project:

1. NS01 is on the North Branch of the Black River at the Vermont Route 131 bridge near the intersection of Schoolhouse Road;
2. NS02 is on the Black River at Vermont Route 106 bridge near the intersection with Mill Road;
3. NS03 is at Stoughton Pond Beach;
4. NS3A is at the discharge from Stoughton Pond; and
5. NS05 is on the Black River at the North Springfield Lake discharge at the USGS gaging station.

In addition, there are several other stations at which water quality has been measured one or more times since the USACE began its program at North Springfield Lake in 1971.

Water samples are analyzed for temperature, dissolved oxygen (D.O.), pH, turbidity, conductivity, *Escherichia coli*, alkalinity, nitrogen and phosphorus. In addition, heavy metals or other substances may be measured at these stations. The most recent years in which data were collected are 1994 and 1997. The beach station is monitored for *E. coli* every two weeks from approximately Memorial Day to Labor Day. The well at Stoughton Pond beach recreation area is monitored quarterly for total coliforms and annually for nitrate.

3.2.8.2 Water Quality:

As referenced in the 1983 Water Quality Evaluation, North Springfield Lake's overall water quality is good in that it generally meets State standards and is suitable for all intended uses. The Black River and the North Branch of the Black River have high suspended sediments and turbidity after rain and/or flooding due to the erosion of sandy soils in the area, but under normal conditions this is not considered a problem. Algal nutrient levels are in the range typical of a borderline oligotrophic/mesotrophic impoundment for North Springfield Lake, and are in the range typical of a mesotrophic impoundment for Stoughton Pond. Metals concentrations are very low, typical of background levels. The waters are free of floating oils and pollutants that form objectionable deposits or nuisances. In general, such waters should provide for good water-contact recreation.

The permanent pools at North Springfield Lake and Stoughton Pond are maintained and larger temporary impoundments occur during floods. The overall effects of these impoundments on water quality are minor. Flood control pools are maintained for as short as time as possible and then released. Some D.O. depletion may occur in the depths of larger flood control pools; however, aeration in the outlet works would restore good levels in the discharge. The temporary flood control pools at North Springfield Lake also aid downstream water quality by removing some of the sediment and debris that would be washed in during a storm.

North Springfield Lake exhibits a form of weak and intermittent thermal stratification that has minimal adverse impacts on water quality. This type of stratification forms on calm sunny days but can be broken up by winds at night or on cool cloudy days. Because of the intermittent nature of the stratification, and a tendency for inflow to flow along the bottom of the lake, there is minimal dissolved oxygen depletion in the depths of the lake. This type of stratification has no significant effects on pH or conductivity levels in the lake.

3.2.8.3 Ground Waters:

All groundwater in the State of Vermont is classified as Class III, unless reclassified by the Secretary as Class I, II, or IV. Class III groundwater is suitable as a source of water for individual domestic drinking water supply, irrigation, agricultural use, and general industrial and commercial use. No groundwater in the vicinity of North Springfield Lake has been reclassified and remains Class III. The only ground water monitoring at the project is measurements of coliforms and nitrate in a drinking water well at the Stoughton Pond recreation area. Results have been within State standards.

3.3 Archaeological Resources

An archaeological reconnaissance survey of North Springfield Lake area was completed in 1982 by Peter Thomas of the Department of Archeology, University of Vermont under contract to the

USACE New England Division. The purpose of the reconnaissance level survey was to provide information on the archaeological sensitivity of North Springfield Lake, and review possible effects of current project operations on cultural resources.

Two primary tasks were completed: background research to review data on known cultural resources; and formulation of a predictive model for the project area. The project area was stratified into zones of expected archaeological sensitivity. Limited subsurface testing was completed only on the fee-owned lands (1,372 acres) to field check the predictive model for prehistoric and historic resources. Historic cultural resources were identified from documentary sources, subsurface testing, and the walkover inspections.

A total of 68 historic period archaeological sites were identified during the reconnaissance survey, of which 44 require additional investigations. In addition, a number of areas of high and moderate prehistoric archaeological sensitivity were identified. Note that archaeological site locations are confidential information that are exempt from Freedom of Information Act requirements, and cannot be divulged to the general public.

3.3.1 Prehistoric Resources

Thomas did not identify any specific sites of prehistoric significance. However, he does note that it is very likely that the Black River watershed was actively exploited as a hunting/fishing/trapping territory during the Late Woodland period (950 to 450 B.P.)

The archaeological reconnaissance survey identified several zones of high and moderate prehistoric archaeological sensitivity within North Springfield Lake. Comprehensive background research indicates that North Springfield Lake included both riverine and tributary stream/wetland environmental settings with high natural resource potential. Certain sections of North Springfield Lake have physical attributes that appear to be very similar to the locations of previously recorded prehistoric sites in the interior uplands of Vermont. Limited subsurface testing (98 test pits) in areas of high and moderate prehistoric sensitivity failed to identify any prehistoric sites. The lack of prehistoric resources encountered within the project area during the reconnaissance survey can be explained by the limited testing completed during the reconnaissance investigation of North Springfield Lake, and the post-construction deposition of flood sediments in several portions of the project area. However, the testing served to refine the initial sensitivity assessment of the project area. It is estimated that 550 acres of the 1,372 acres of fee-owned land possess moderate prehistoric archaeological sensitivity. The results of the reconnaissance survey suggest that additional, more intensive archaeological survey of these sensitive areas could identify prehistoric sites.

3.3.2 Historic Resources

A site that is determined to be significant is one that meets eligibility requirements for nomination to the National Register of Historic Places. As previously stated, 44 of the 68 identified sites at North Springfield Lake require further archaeological investigations to assess

their potential National Register eligibility. These sites represent a variety of site types: transportation; domestic; agrarian, and industrial.

Recommendations were made in the 1982 report for each of the 68 archaeological sites, based on the limited data available from the reconnaissance survey (Thomas et al. 1982). Since no assessment can yet be made as to the significance of the 44 known archaeological sites on fee-owned land at North Springfield Lake that require additional evaluation; they must be treated as though they are eligible for the National Register until further archaeological investigations are completed.

3.4 Recreational Resources

North Springfield Lake provides numerous opportunities for recreational pursuits. The project contains one developed recreation area (see *Figure 2 – Site Plan*), as well as undeveloped passive recreational resources as described below.

3.4.1 Existing Facilities

3.4.1.1 General Description:

Stoughton Pond Recreation Area is the only developed recreation area at the project. The area includes picnic sites, a beach, parking area, a restroom building, a changehouse, and a picnic shelter. Two boat ramps are also available on project lands. One is located on the east side of Stoughton Pond and the other at the northern end of the main pool.

The State of Vermont, Agency of Environmental Conservation maintains a lease for a public park and recreational purposes on approximately 100 acres located off Reservoir Road approximately 1/4 mile north of the main dam. A portion of this area is also licensed to the Vermont Girl Scout Council for the sole purpose of camping facilities and nature trail development for the Girl Scouts.

3.4.1.2 Recreation Season and Hours of Operation:

The park and all its facilities are open during the hours of 8:00 a.m. to 8:00 p.m. from the third Saturday in May to the first Sunday after Labor Day in September. The park is also open to pedestrians during the rest of the year. However, restrooms are closed during those off-season dates.

3.4.1.3 Group Use Permits:

There is no formal set-aside group area at North Springfield Lake. However, several spots on the project have been used by public service organizations such as the scouts, 4-H clubs, and military units. The use of these areas is governed on a case-by-case basis by issuance of a Special Use Permit from the basin manager. The picnic shelter at Stoughton Pond may be reserved for a nominal fee.

3.4.1.4 Public Access:

North Springfield Lake, the main dam, is located one-half mile off Route 106 along reservoir road in Springfield, VT. The east access nature areas and Girl Scout areas are located off Reservoir Road and 1/4 mile north of the main dam. Stoughton Pond Recreation Area is situated in Weathersfield, VT on Stoughton Pond Road one-half mile from its junction with Route 106. The reservoir west access area is situated at the east end of Maple Street in Perkinsville approximately three-quarters of a mile from Route 106. Both developed and undeveloped parking of various types and numerous locations are available at most areas. Trails and gravel roads are available for equestrians and hikers.

The North Springfield Lake impoundment is maintained as a conservation pool for recreational and wildlife management purposes. Stoughton Pond covers approximately 49 acres and is also for recreational and wildlife management purposes.

3.4.1.5 Drinking Water and Sanitary Facilities:

Two (2) drinking fountains are available at the Stoughton Pond recreation area (serviced by an on-site potable well). One is located near the picnic shelter, while the other one is near the comfort station. Faucets are located inside the restrooms for both public use and use by the service contractor. One (1) comfort station is available at North Springfield Lake at the Stoughton Pond Recreation Area, consisting of:

<u>Men's side</u>	<u>Women's side</u>
1 sink	1 sink
1 handicapped toilet	1 handicapped toilet
1 urinal	2 toilets
All toilets are flush-matic type.	

3.4.1.6 Stoughton Pond Recreation Area Day Use Picnic Facilities:

- 25 picnic tables
- 15 grills
- 2 large shelter grills
- 1 picnic shelter

3.4.1.7 Swimming:

A washed-sand beach swimming area is located on the west shore of the Stoughton Pond. This area is marked with a float line and buoys.

3.4.1.8 Boating:

The use of water craft (including canoes, rafts, rowboats, kayaks, and other vessels) traveling less than 5 m.p.h. are permitted. Electric and gasoline motors are allowed. All persons using a floatation device (boat, raft, etc.) must comply with applicable US Coast Guard and Corps of Engineers' regulations.

3.4.1.9 Open Field/Lawn Areas:

There are over nine acres of regularly mowed and maintained open fields and lawn areas at the Stoughton Pond Recreation Area that are available for blanket picnicking, sunbathing, games, passive recreation, and special events.

3.4.1.10 Hunting, Trapping, and Fishing:

Hunting, trapping, and fishing are permitted in accordance with applicable federal, State, and local laws except in areas designated by the Division Engineer. Trapping requires a free permit from the USACE. Currently, no game stocking program is in effect on the project. The fifty-acre Stoughton Pond, which has a boat ramp and a five-mile per hour speed limit, is stocked with rainbow trout and has a developing largemouth bass population. Brook trout are available in the feeder streams. There are also extensive fishing areas in the 75-acre lake and along five miles of streams. The boat ramp is usable by canoes and small, flat-bottomed boats only, due to siltation. Free nighttime fishing permits are required to fish after posted closing hours and are available at the basin office located on Reservoir Road, Perkinsville, Vermont.

3.4.1.11 Communications:

The public pay telephone formerly located near the Stoughton Pond Recreation Area comfort station, has been replaced with an emergency only 911 telephone. Cellular telephone service is available at the site.

3.4.1.12 First Aid:

Emergency first aid is available from uniformed park personnel.

3.4.1.13 Park Information:

Park rules, interpretive schedules, and other park information are posted at the beach area and the main recreation area. A brochure box with Corps Lakeside Recreation brochures, Title 36, CFR, pamphlets, and interpretive program schedules are also maintained in the main recreation area. Park personnel are available to assist visitors.

3.5 Recreational Analysis

3.5.1 Existing Use:

Historically, the visiting public has regularly used the recreation facilities at North Springfield Lake. There were more people using the park in the 1980's than have in recent years. But visitation has been fairly steady throughout the past nine years with a slight drop-off in FY2000 and FY2001. The number of visitor hours recorded are significantly influenced by beach visitation, when the beach is open, visitor hours increase and when the beach is closed, visitor hours drop off dramatically. **Table 9 – Visitation Data** summarizes recreational attendance in visitor hours at North Springfield Lake from 1992 to 2002:

North Springfield Lake Flood Control Project Springfield and Weathersfield, Vermont											
<i>Table 9 – Visitation Data*</i>											
Fiscal Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Visitor Hours	29375	13395	28590	24512	28990	23187	26370	24168	24983	16463	31002

* Source: U.S. Army Corps, N.E. District, VERS Report. All visitation data is based on traffic counters located around the facility.

As shown above, use of the North Springfield Lake's facilities has been fairly consistent since 1992, with low visitation in FY1993 and FY2001 due to poor weather conditions with FY2002

recording the highest visitation in the last 11 years. The majority of usage involves swimming, sunbathing, picnicking, hunting, fishing, sightseeing, snowmobiling, cross-country skiing, hiking, and nature walking. Due to the type of facilities available at the project, it is common for the recreation areas to experience a high level of usage during weekends when the weather is hot and sunny.

3.5.2 Natural and Scenic Qualities:

The Black River Watershed is typical of much of the upland New England physiographic province. The reservoir topography is generally steep, wooded hills with predominantly easterly and westerly exposures. A large amount of land in the bottom of the basin is gently rolling fields. In general, the watershed is conducive to rapid runoff. The elevation varies from 3,700 feet NGVD at Shrewsbury Peak in the northern headwaters to about 280 feet NGVD at the confluence of the Black and Connecticut Rivers in Springfield, Vermont. Visitors are attracted to the area by the diversity of geologic and natural features that were formed in this area. The area is typical of much of the upland New England physiographic province inasmuch as it displays the character of an ancient plateau dissected by narrow V-shaped valleys. Crystalline igneous and metamorphic rocks underlie remnants of the plateau (at an average elevation of 1,500 feet NGVD) and the valleys are lined with sands and gravels of glacial and more recent fluvial origin.

North Springfield's underlying base-rock foundations are Paleozoic in origin. Granitic gneiss outcrops occur near the dam. Surface geology in the basin is composed of varying thickness of glacial till. The terraces surrounding the permanent pool are predominantly Merrimac soils, with Colrain and Woodstock soils occurring on some of the glacial till covered upland. Ondawa and Agawam soils are found on the bottomlands along the river. Bottomland Ondawa and Agawam soils are well-drained sandy loams with moderate to moderately rapid permeability. Agawam is low in both fertility and moisture capacity. Ondawa is medium for both fertility and moisture capacity.

Open fields that were formerly used for agricultural purposes cover about half of the project area. Approximately 15 percent of the area is marsh and the remainder, including the steep slopes, is woodland. Forest cover in the project area consists of a mixed deciduous-coniferous stand that includes white and yellow birch, hemlock, white pine, beech and butternut on steep slopes; black cherry, sugar maple and basswood with an undergrowth of steeple bush, brake fern and blackberry on level areas; and willow, elm, alder, and aspen along the river. Vegetation around the lake is about one-third trees, grass and brush, with the remaining two-thirds about equally divided between marsh and open water.

3.5.3 Projected Use:

The demand for recreation at North Springfield Lake is expected to continue to increase in the coming years. This assumption is based on existing and past use of the facility as well as recreational needs projected by the Vermont Statewide Comprehensive Outdoor Recreation Plan

(SCORP), dated January 2000. The demand for public outdoor recreation preferences in Vermont is demonstrated by the following SCORP findings:

- The numbers of participants will continue to increase for almost all of recreational activities. The family travel and recreation market will continue to increase. (Land Conservation Plan's Recreation Work Group's *White Paper*).
- Nationally, activities expected to have the greatest growth rates through 2040 are downhill and cross-country skiing, day hiking, pool swimming, backpacking, visiting pre-historic sites, and running/jogging. (Northern Forest Lands Council).
- Hunting, fishing, boating, trapping, hiking, canoeing, and active winter recreation travel will continue to have their niches in the travel market. (Northern Forest Lands Council).

New emerging "consumer" trends include the desire for convenience over complexity. Requests from potential park visitors indicate changing demands to a more active, more interesting, and more comfortable experience. Request increases include cabins to rent, what to do in a park and surrounding area, and hookups for recreational vehicles. (Land Conservation Plan's Recreation Work Group's *White Paper*) (Parks Long Range Plan):

- Recreationists and travelers will seek more "back-to-nature" and personally enriching experiences. (Land Conservation Plan's Recreation Work Group's *White Paper*).

The potential market areas for facilities at North Springfield Lake were also assessed to determine the population base that is currently served and that will be served in the future. The primary market area for this project was assumed to be the area within a 20-mile radius of the facility. This area is shown on attached **Figure 6 – Market Area Plan - North Springfield Lake**. The secondary market area can be considered to be a region that encompasses New England and the immediately surrounding states.

3.5.4 Carrying Capacity:

The carrying capacity of North Springfield Lake is constrained primarily by: the number of parking areas; the types of recreational activities; and the number and size of developed recreational facilities available at the present time.

While current visitation levels, as shown in Table 10, have essentially remained constant over the past 11 years, the projected future demand for this type of recreational facility is expected to increase in the coming years (SCORP 2000). Therefore, it is important that future addition and expansion of some recreational uses be considered along with the continued maintenance and improvement of existing facilities.

3.5.5 User Conflicts:

North Springfield Lake provides a variety of active and passive recreational opportunities throughout the year. These activities include: hiking, snowmobiling, cross-country skiing, sightseeing, fishing, hunting, trapping, swimming, sunbathing, ball playing, picnicking and enjoying the great outdoors.

Currently there are no significant use conflicts that have been observed between pedestrians, vehicles and other recreational users of the North Springfield Lake facility.

4.0 PUBLIC INVOLVEMENT AND COORDINATION

Coordination with elected officials, other agencies, and the public was conducted as part of the planning process. This insured that the Master Plan provided the best response to local and regional needs, project resource capabilities and suitabilities, and expressed public desires.

Public coordination was initiated with the issuance of a Public Notice and a News Release by Colonel Thomas L. Koning, Corps of Engineers, District Engineer, on October 29, 2002. These documents announced the initiation of the study and solicited input. A complete mailing list of those that received the Public Notice is included in ***Appendix A – Public Coordination Mailing List***.

Two Public Workshop Meetings were held with the public, and State and Local officials, during the Master Planning process. The first meeting was held at the Springfield Selectmen's Hall, Main Street, Springfield on November 13, 2002, and the second was held at the Weathersfield Elementary School, on Route 106, Perkinsville on December 11, 2002. The attendance lists for these meetings are included in ***Appendix A***. These meetings resulted in the following public general comments which will be/addressed in the North Springfield Lake OMP:

1. Research the addition of a temporary bridge for snowmobile club member use. A potential location would be across the Black River, near the lower Perkinsville Dam and old bridge abutment.
2. Concern about security with night access through the "west side gate" open for night fishing.
3. Research how walking/equestrian trails can be improved through coordination with the equestrian clubs.
4. Request that the USACE identify the feasibility of increasing the number of hay fields available for standing hay sales.
5. Research the need for increased security and restriction of "undesirable recreational use", e.g. installing large stone barricades in the Springweather area.
6. Identify the feasibility of public groups volunteering assistance with adult educational programs at the project.
7. Request to maintain open area accessibility for model airplane groups.
8. Request to maintain the bird/nature trails in the "Springweather" habitat area.

9. Confirm and maintain new eagle nest area on USACE property; and evaluate any O&M changes that need to be made.
10. Research restricting snowmobiling along the water's edge.
11. Research and identify the need for increased "policing" of snowmobilers that ride off of designated trails.
12. Request that the USACE develop a "work group" of Town/public/USACE personnel to obtain public input on various activities at the project.
13. Concern with "invasive" vegetation and how they will be identified, controlled and managed.
14. Request to coordinate with the Weathersfield Parks and Recreation Commission members regarding the maintenance of the existing trails.
15. Request to provide updated GIS mapping of project to VT GIS.
16. Research the need for a new section of equestrian trail, and moving an existing snowmobile trail.
17. Evaluate horse trailer parking problems at the Stoughton Pond parking area.
18. Evaluate the need to improve the Stoughton Pond boat ramp access road.
19. Evaluate the need to improve (or relocate) the Perkinsville boat ramp for access to Springfield Lake.

In addition, concern was raised that another possible Town easement for public access to the project may be necessary, from the corner of Piper and Reservoir Roads, heading northeast over what may be private land. This must be initiated by the Town of Springfield through the Real Estate Division at the Corps headquarters in Concord, Massachusetts.

5.0 RESOURCE MANAGEMENT OBJECTIVES

The following natural, recreation and cultural resource management objectives were prepared from information provide by the USACE New England District and through public meetings held within the Towns of Springfield and Weathersfield, Vermont. Resource objectives have been developed to guide future design, development and management of the resource base, natural and manmade, to obtain the greatest possible benefit through meeting the needs of the public and protecting and enhancing environmental quality.

5.1 Natural Resources Objectives

The following are a series of natural resources goals and objectives that have been developed through public meetings and needs identified by the USACE as steward of the property:

1. Provide for the management of all natural resources associated with the project with input from the local community, to include the protection and preservation of rare, threatened and endangered species, the harvesting of forest resources, the protection of water quality, and the implementation of programs to manage invasive, non-native species.
2. Enhance and protect fish and wildlife habitat for native indigenous species through the use of various woodland, wetland, and open land management programs.
3. Monitor wildlife species and their habitat within the project limits.
4. Promote and evaluate public use of the natural resources of the project to include hunting, trapping, fishing, viewing, and snowmobiling. Support the state fish stocking program and efforts to establish a warmwater fishery.
5. Protect and conserve wetlands, and rare plant and animal habitats, such as vernal pools, from detrimental activities.

5.2 Recreational Resources Objectives

The following are a series of recreational resources goals and objectives that have been developed through public meetings and needs identified by the USACE as steward of the property:

1. Provide for the continued maintenance and growth of recreational opportunities (programs, etc.) with input from the local community.

2. Maintain and improve the Interpretive Services and Outreach Program to enhance the public's understanding and appreciation of the role of the USACE in the administration and management of North Springfield Lake.
3. Provide for the continuance of activities associated with fish and wildlife resources.
4. Maintain existing trails on project lands.
5. Identify, develop, and promote trails on project lands in accordance with natural resources objectives.

5.3 Cultural Resources Objectives

The following are a series of cultural resources goals and objectives that have been developed through public meetings and needs identified by the USACE as steward of the property:

1. Protect known and documented prehistoric and historic archaeological sites. Measures may include, but not be limited to:
 - a. Avoid known sites, if possible. If resources cannot be avoided, every effort should be made to minimize these impacts. If impacts to significant resources are unavoidable, then further archaeological investigations may be required prior to implementation. In all cases, development activities should be reviewed by a USACE staff archaeologist and may require coordination with the Vermont State Historic Presentation Officer (VT SHPO).
 - b. Monitor the project area for evidence of unauthorized excavation or collection of cultural resources and damage to sites. Known sites should be maintained and preserved as important project resources.
2. Consult with the USACE archaeologist prior to any development or disturbance on USACE property.
3. Support interpretative programs for historic and archaeological resources, where appropriate and in accordance with federal laws and directives.

6.0 LAND ALLOCATION AND CLASSIFICATION

6.1 Land Allocation

All project lands will be allocated in accordance with the authorized purposes for which they were acquired. Project land will be allocated into one of the following categories:

- (1) Project Operations – Lands acquired in accordance with the authorized documents for operation of the project, i.e., flood control, hydropower, navigation, water supply, etc.
- (2) Recreation – Separable lands acquired in accordance with the authorized documents for public recreation.
- (3) Fish and Wildlife - Separable lands acquired in accordance with the authorized documents for fish and wildlife management.
- (4) Mitigation - Lands acquired or designated in accordance with the authorized documents to offset losses associated with development of the project.

All project lands at North Springfield Lake were acquired for flood control purposes; therefore, all project lands are allocated to the Project Operations category.

6.2 Land Classification

In accordance with the USACE regulation, ER 1130-2-550 and pamphlet EP 1130-2-550, the allocated project lands will be further classified to provide for development and resource management consistent with authorized project purposes, and the provisions of the National Environmental Policy Act (NEPA) and other federal laws. The classification process refines the land allocations to fully utilize project lands and must consider public desires, legislative authority, regional and project specific resource requirements and suitability.

Land classification categories are described below.

- (1) Project Operations – The project operations classification category includes land required for the flood control structure, operations center, office, maintenance facilities and other areas used solely for project operations.
- (2) Recreation – Land developed for intensive recreational activities by the visiting public, including developed recreation areas and areas for concession, resort, and quasi-public development.
- (3) Mitigation – This category only includes land acquired or designated specifically for mitigation.

- (4) Environmentally Sensitive Areas – Areas where scientific, ecological, cultural or aesthetic features have been identified. Although these areas are usually found within one of the other classification categories, they must be considered by management to ensure the sensitive areas are not adversely impacted. Limited or restricted use by the public should be considered for managing the land in this classification. In addition, no agricultural or grazing uses are permitted in environmentally sensitive lands.
- (5) Multiple Resource Management – Land managed for one or more of, but not limited to the following activities, to the extent that they are compatible with the primary land allocation(s).
 - a. Recreation - Low-Density – Activities such as hiking, primitive, camping, wildlife, observation, hunting or similar low-density recreational pursuits.
 - b. Wildlife Management General – Fish and wildlife management activities.
 - c. Vegetative Management – Management activities for the protection and development of forest and vegetative cover.
 - d. Inactive and/or Future Recreational Areas – Recreation areas planned for the future or temporarily closed.
- (6) Easement Lands - All lands for which the USACE holds an easement interest but not fee title.

The following information will describe the classification of land within the bounds of North Springfield Lake. Previous sections concerning the project area including purpose, natural and recreational resources and development constraints and opportunities provided the basis for **Figure 7 – Land Classification Plan**.

6.2.1 Project Operations

The USACE operates and maintains the North Springfield Lake flood control facility to ensure the protection of life and property downstream of the dam structure. The project is staffed full-time by a Project Manager and one park ranger, who perform operation and maintenance (O&M) and administrative duties. Additional rangers are usually hired during the summer months. The project consists of about 1,372 acres of fee-owned land and about 376 acres of flowage easement. The project has two permanent impoundments or pools: the “conservation pool” or North Springfield Lake, is located just upstream of the dam structure; and a “recreational pool” called Stoughton Pond, is located approximately three miles upstream of the dam, on the North Branch of the Black River in Weathersfield, Vermont. Stoughton Pond is impounded by the relocated Town Road No. 22, embankment (now Stoughton Pond Road).

The facilities that are maintained by the USACE park rangers at North Springfield Lake include the spillway, intake and outlet tunnel, operations office, dike, debris field, access roads, and surrounding area.

6.2.2 Recreation

Intensive recreation areas in North Springfield Lake include:

- Stoughton Pond Recreation Area is the only developed recreation area at the project. The area includes picnic sites, a beach, parking area, a restroom building, a changehouse, and a picnic shelter. Two boat ramps are also available on project lands;
- State of Vermont, Agency of Environmental Conservation has a lease for a public park and recreational purposes on approximately 100 acres. A portion of this area is also licensed to the Vermont Girl Scout Council for the sole purpose of camping facilities and nature trail development for the Girl Scouts;
- drinking water and sanitary facilities; and
- picnic facilities.

The approximate locations of these facilities are identified on **Figure 7**.

6.2.3 Mitigation

No land areas at North Springfield Lake are classified in this category.

6.2.4 Environmentally Sensitive Lands

Several locations within the project site constitute areas of scientific, ecological, cultural, or aesthetic value. The oak-pine forest and rich northern hardwood forest are examples of locally significant natural communities due to their vegetative composition and age structure. The emergent riparian marsh and floodplain meadow terraces are especially valuable as exemplary wildlife habitats. Other areas within the project classified as providing scientific or ecological value are shown on **Figure 7**. Those areas identified as having cultural resource value include the prehistoric and historic sites documented within North Springfield Lake. However, the exact location of these cultural resources is not shown on **Figure 7** as a protective measure.

The following descriptions are provided for each of the environmentally sensitive areas at North Springfield Lake, as excerpted from the 1999 “Natural Communities and Flora” report:

Site 1 – North Springfield Lake Uplands:

LOCATION: Southwest of the dam, south of conifer plantations.

SOURCE OF INFORMATION: 1998 Field visit (M. Lapin)

OWNERSHIP: US Army Corps of Engineers

SIGNIFICANCE:

1. A population of rare hay sedge (*Carex argyrantha*) grows in the woods on a short, south-facing slope. (State rank – S2, Global rank – G5).

2. An undetermined milkweed nearby may be uncommon poke milkweed (*Asclepias exaltata*). (State rank – S3, Global rank – G5).

Site 2 – Springweather Nature Area:

LOCATION: West of intersection of Reservoir Basin and Wellwood Orchard Roads

SOURCE OF INFORMATION: 1998 field visit (M. Lapin)

OWNERSHIP: US Army Corps of Engineers

SIGNIFICANCE:

Rare nodding trillium (*Trillium cernuum*) occurs near the nature area trailhead. This is the only known location of the species in the Connecticut River watershed in Vermont. (State rank – S2, Global rank – G5).

Site 3 – Reservoir Basin and Wellwood Orchard Roads Woods:

LOCATION: Southeast of intersection of Reservoir Basin and Wellwood Orchard Roads

SOURCE OF INFORMATION: 1998 field visit (M. Lapin)

OWNERSHIP: US Army Corps of Engineers

SIGNIFICANCE: Locally Significant - The site is a relatively undisturbed northern hardwood-hemlock forest in which there is a large and interesting forest seep.

Site 4 – Reservoir Inlet:

LOCATION: Along an unnamed stream inlet northwest of the dam

SOURCE OF INFORMATION: 1998 field visit (R. Popp)

OWNERSHIP: US Army Corps of Engineers

SIGNIFICANCE: Rare to uncommon Pursh's bulrush (*Scirpus pushianus*) grows on exposed mud flats along the inlet stream. (State rank – S2S3, Global rank – G4G5).

Site 5 – Stoughton Pond:

LOCATION: North Branch Black River, 700m north of confluence with Black River.

SOURCE OF INFORMATION: 1998 field visit (M. Lapin)

OWNERSHIP: US Army Corps of Engineers

SIGNIFICANCE: Rare to uncommon Pursh's bulrush (*Scirpus pushianus*) grows on sand-spits in the pond. (State rank – S2S3, Global rank – G4G5).

Site 6 - South of Stoughton Pond Road Embankment:

LOCATION: South of Stoughton Pond Road Embankment to Black River including east and west of North Branch.

SOURCE OF INFORMATION: US Army, Corps of Engineers Biologist (G. Pelton).

SIGNIFICANCE: Locally Significant wood turtle habitat.

6.2.5 Multiple Resource Management

A significant portion of North Springfield Lake can be characterized as multiple resource management areas. These resources include surface waters (Black River, North Springfield Lake, Stoughton Pond), wetlands, forested areas, fields and low-density recreational areas. A general description is as follows:

- (a) Recreation – Low-Density – Lands allocated for low-density recreation activities at North Springfield Lake include areas suitable for swimming, fishing, canoeing, hunting, trapping, hiking, sightseeing, sunbathing, ball playing, picnicking, cross-country skiing, snowshoeing and snowmobiling.
- (b) Wildlife Management General – The areas surrounding the Black River, forested area and open fields provide excellent habitat environments for a variety of wildlife. These areas are subject to protection under state and federal environmental laws. Lands managed for the enhancement of resident and migratory wildlife species are designated for wildlife management. These lands may also be used for low-density recreation activities as long as they do not interfere with wildlife management.
- (c) Vegetation Management – Project lands currently utilized for vegetation management.
- (d) Inactive and/or Future Recreation Areas - No land areas at North Springfield Lake are classified in this category.

6.2.6 Easement Lands

North Springfield Lake has 376 acres classified in this category. The approximate boundaries of these easement lands are identified on **Figure 7**.

7.0 RESOURCE DEVELOPMENT PLANS

The USACE New England District has identified the following list of action items for improving operations and recreation at North Springfield Lake:

1. Develop and implement an Adaptive Management Plan for outflow guidance.
2. Maintain cooperative effort with various users of the project.
3. Evaluate the need to improve the Stoughton Pond boat ramp access road.
4. Evaluate the need to improve (or relocate) the Springfield Lake boat ramp.

8.0 CONCLUSIONS

This Master Plan provides guidance for future development at North Springfield Lake. The natural and man-made resources at the project will continue to be managed to provide the best combination of responses to regional and ecosystem needs, project resources and capabilities.

The natural and man-made resources within North Springfield Lake have been identified and analyzed. The project's natural resources include wetlands, exemplary natural communities and cultural resources (which require specific management efforts for their protection); and the man-made resources include project operation areas, both intensive and low-density recreational facilities, as well as areas of wildlife and vegetation management. Additional recreational opportunities were identified through an analysis of regional needs and public comments.

Through land use classification, the Master Plan has designated areas for project operations, recreation, environmentally sensitive lands and multiple resource management. The areas in the vicinity of the dam and office facilities will continue to be used for project operations. Stoughton Pond Recreation Area has been classified as intensive recreation. The remaining areas have been classified as multiple resource management areas.

Through an analysis of regional needs, and the public participation process, the Master Plan identified a continuing need to provide recreational opportunities at North Springfield Lake. This planning process also identified a need to develop and implement an Adaptive Management Plan for outflow guidance, the need to remedy the boat ramp siltation problem at the upper end of the main pool at North Springfield Lake, a need to improve the access road to the Stoughton Pond boat ramp, and the need to maintain cooperative efforts with various user groups at the project.

All specific proposals for recreational development or natural resources management at the project must comply with this Master Plan, the Connecticut River Basin flood control requirements, and the National Environmental Policy Act and federal requirements. Implementation of recommended resource management plans must be performed in accordance with appropriate USACE procedures, e.g. as may be indicated in the Operational Management Plan.

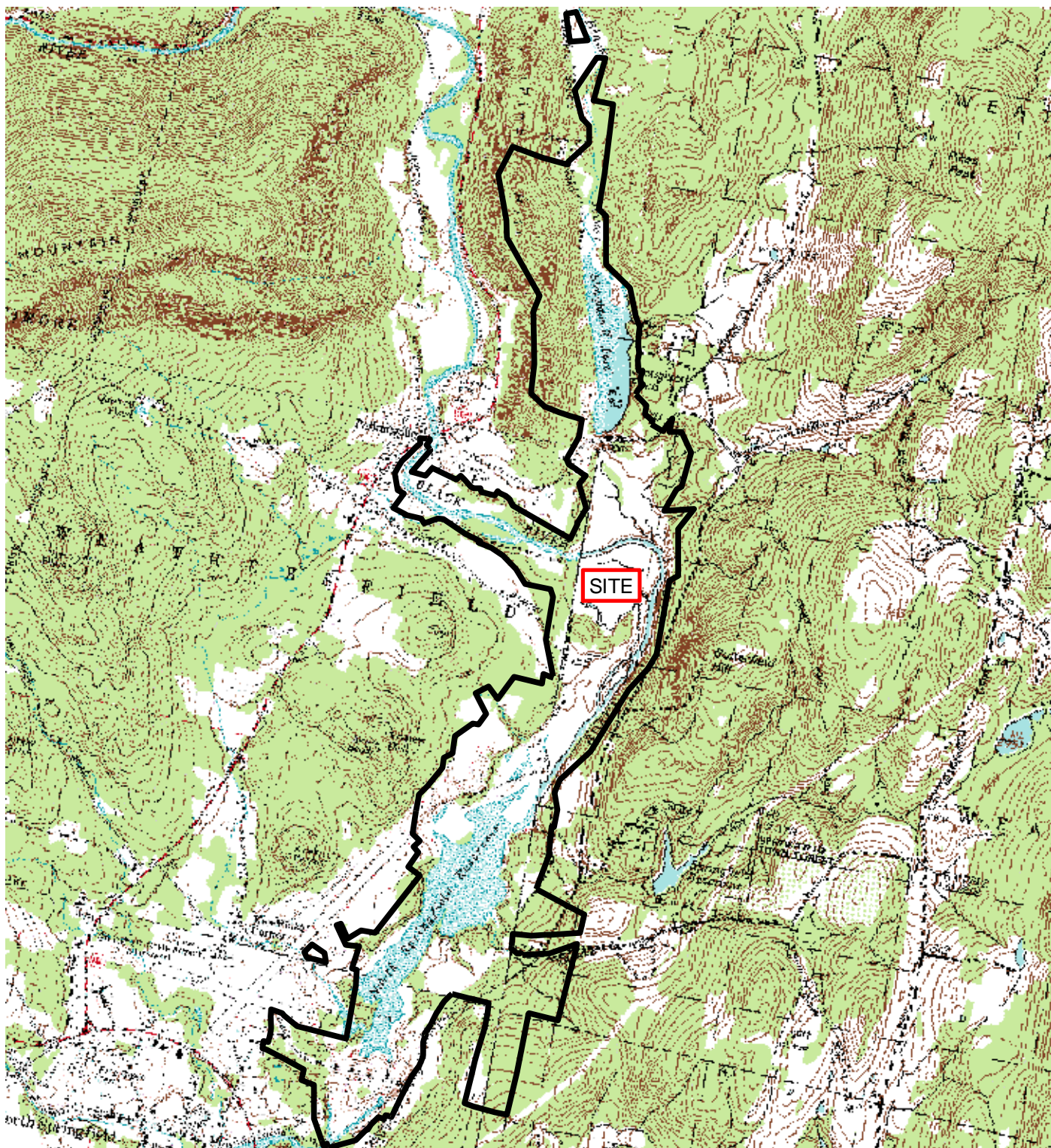
9.0 RECOMMENDATIONS

It is recommended that the North Springfield Lake Master Plan be approved as a guide to the North Springfield Lake Flood Control Project. Approval of this plan would rescind Design Memorandum, Project Plan for Recreation Resources Development, dated 1980.

DRAFT - MASTER PLAN

FIGURES

North Springfield Lake
Springfield and Weathersfield, Vermont



USGS TOPOGRAPHIC MAP
 SPRINGFIELD, VERMONT, 1984
 CHESTER, VERMONT, 1972
 CAVENDISH, VERMONT, 1983
 MT. ASCUTNEY, VERMONT, 1984

APPROXIMATE SCALE
 1 inch equals 3,000 feet



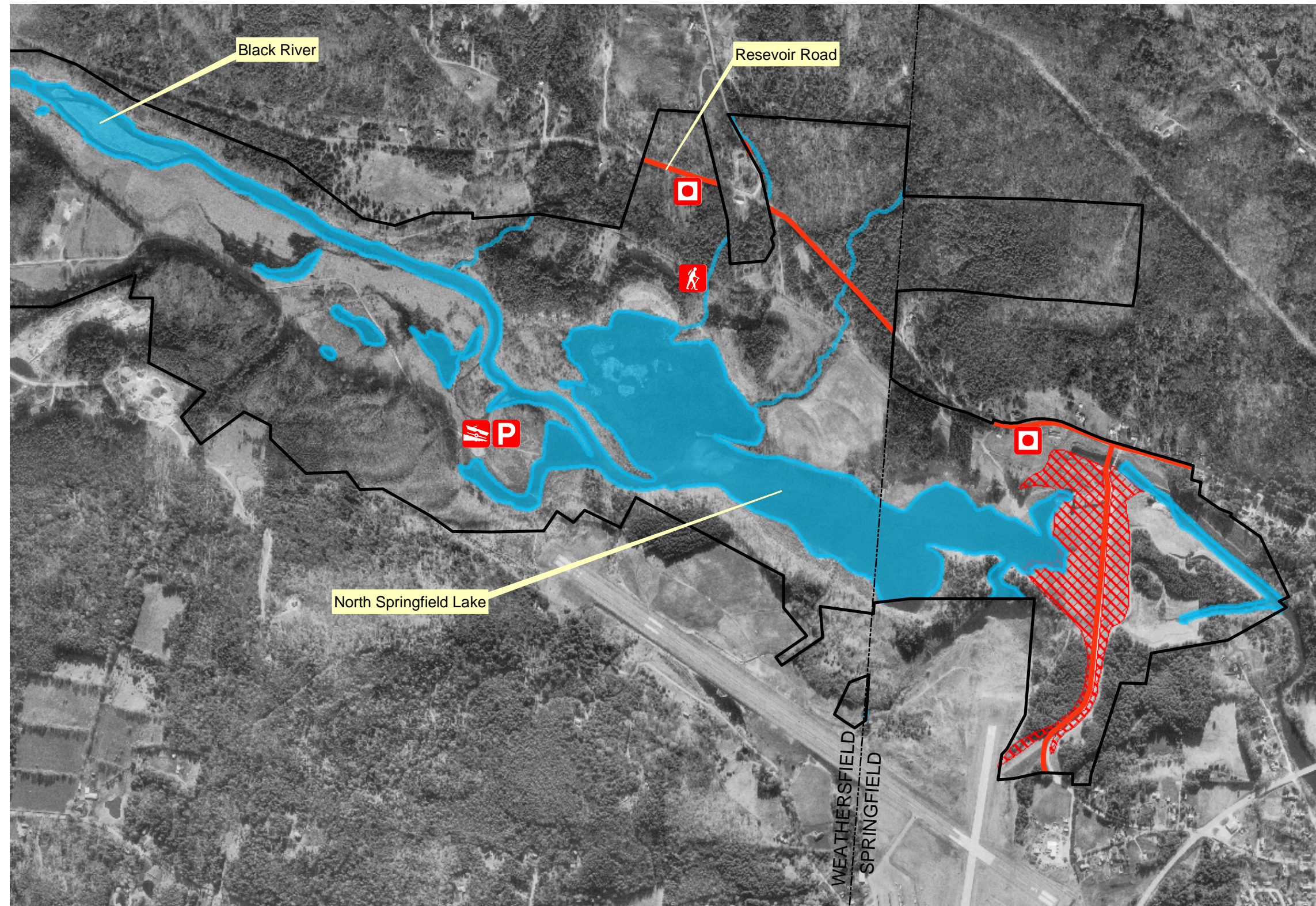
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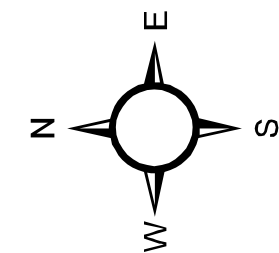
DRAFT FIGURE 1

LOCUS PLAN
 NORTH SPRINGFIELD LAKE
 U.S. ARMY CORPS OF ENGINEERS
 NEW ENGLAND DISTRICT
 SPRINGFIELD AND WEATHERSFIELD, VERMONT

NOVEMBER 2003



- ### Legend
- #### Recreation Facilities
- BATHROOM
 - BOAT LAUNCH
 - PARKING
 - PICNIC
 - SPRINGWEATHER NATURE TRAILS
 - SWIMMING
 - USACE OFFICE
- Project Boundaries
 - Town Line
 - Matchline
 - Streams and Brooks
 - Roads
 - Rivers and Lakes
 - Dam

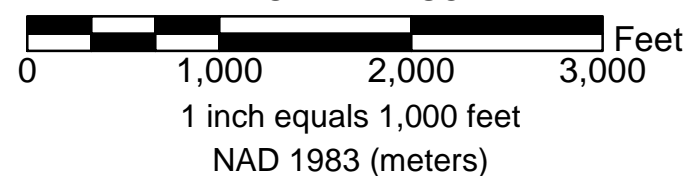


NOTES:

1. Recreation facility data was obtained from "Project Plan for Recreation Resources Development, North Springfield Lake, Springfield and Weathersfield, Vermont," prepared by U.S. Army Corps of Engineers, New England Division, dated 1981. Water body data were obtained from the Vermont GIS project.

2. Data displayed is for illustrative purposes only.

APPROXIMATE SCALE



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DRAFT FIGURE 2 PAGE 1 OF 2

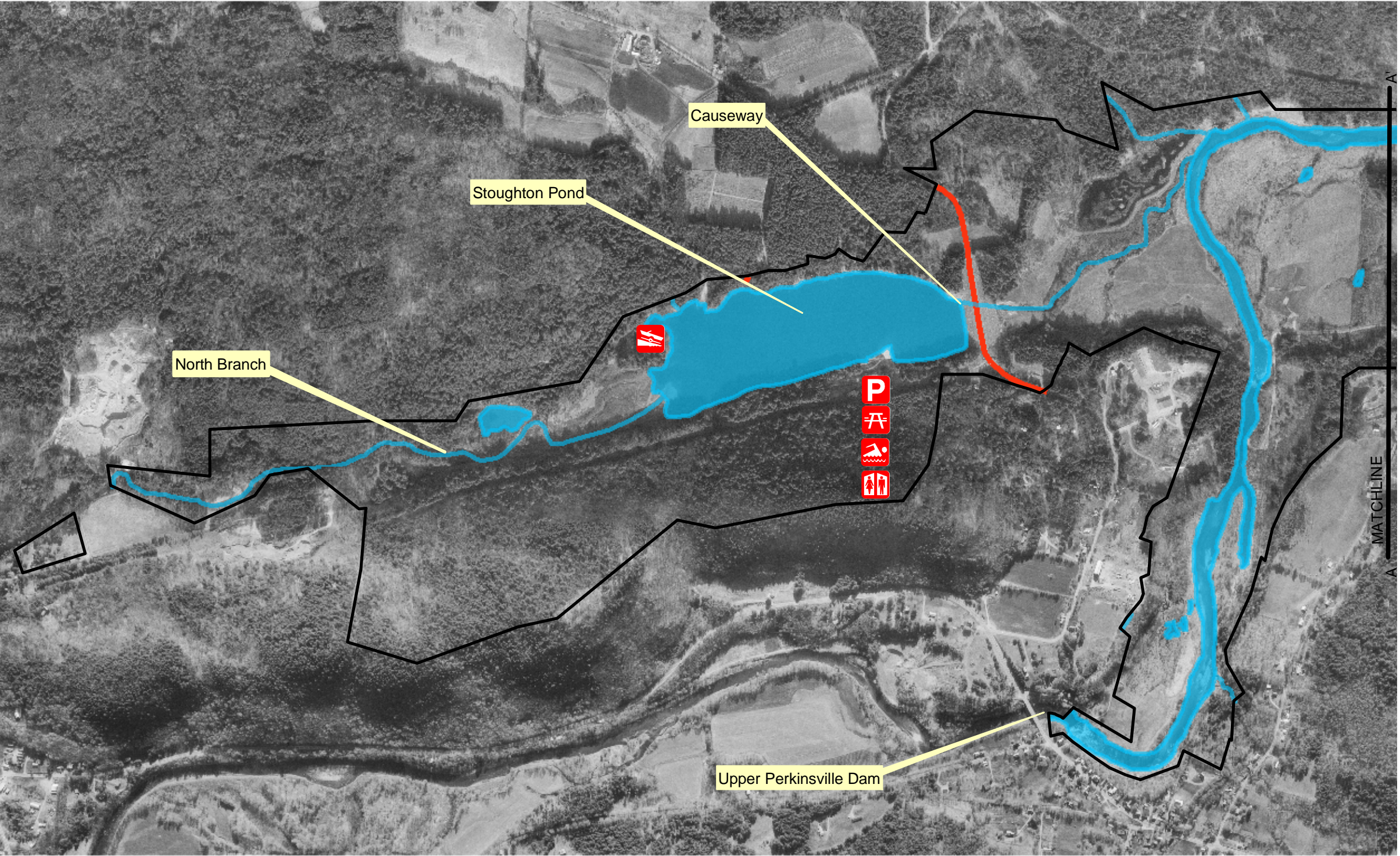
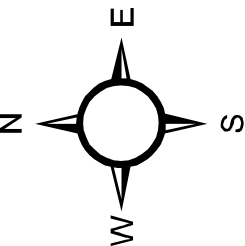
SITE PLAN
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003

Legend

Recreation Facilities

- BATHROOM
- BOAT LAUNCH
- PARKING
- PICNIC
- SPRINGWEATHER NATURE TRAILS
- SWIMMING
- USACE OFFICE

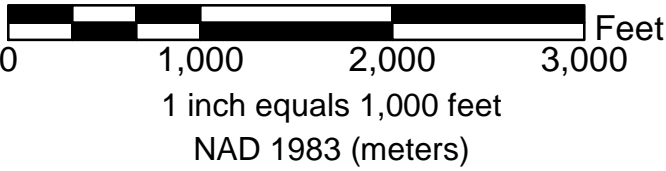
- Project Boundaries
- Town Line
- Matchline
- Streams and Brooks
- Roads
- Rivers and Lakes
- Dam



NOTES:

1. Recreation facility data was obtained from "Project Plan for Recreation Resources Development, North Springfield Lake, Springfield and Weathersfield, Vermont," prepared by U.S. Army Corps of Engineers, New England Division, dated 1981. Water body data were obtained from the Vermont GIS project.
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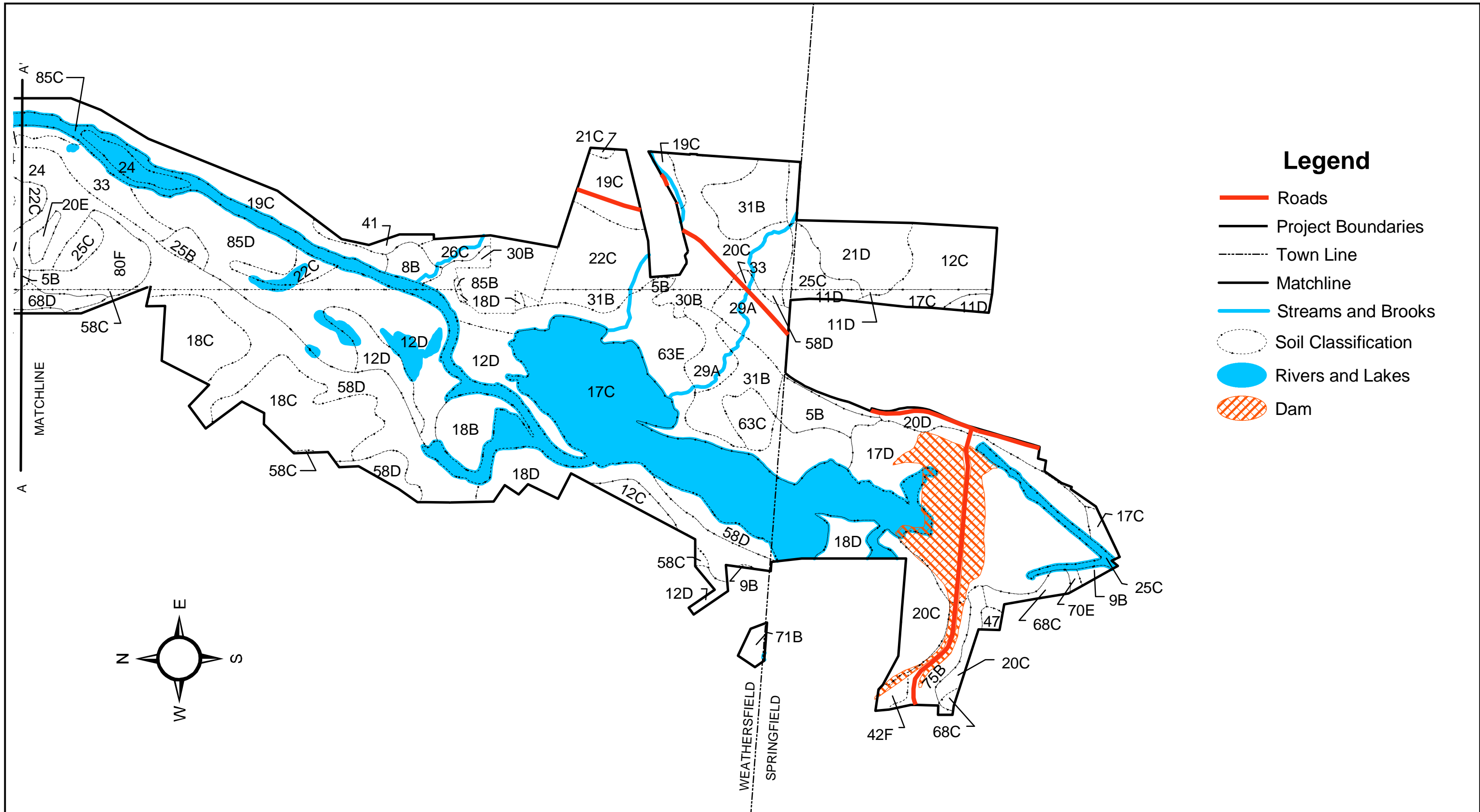
APPROXIMATE SCALE



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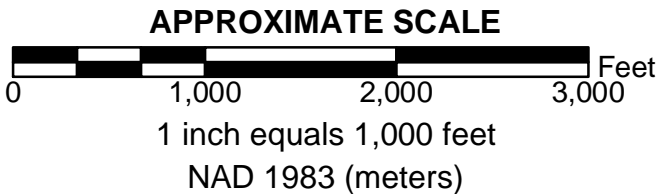
DRAFT FIGURE 2 PAGE 2 OF 2


SITE PLAN
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003



NOTES:

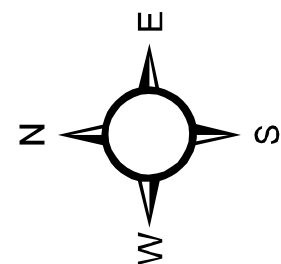
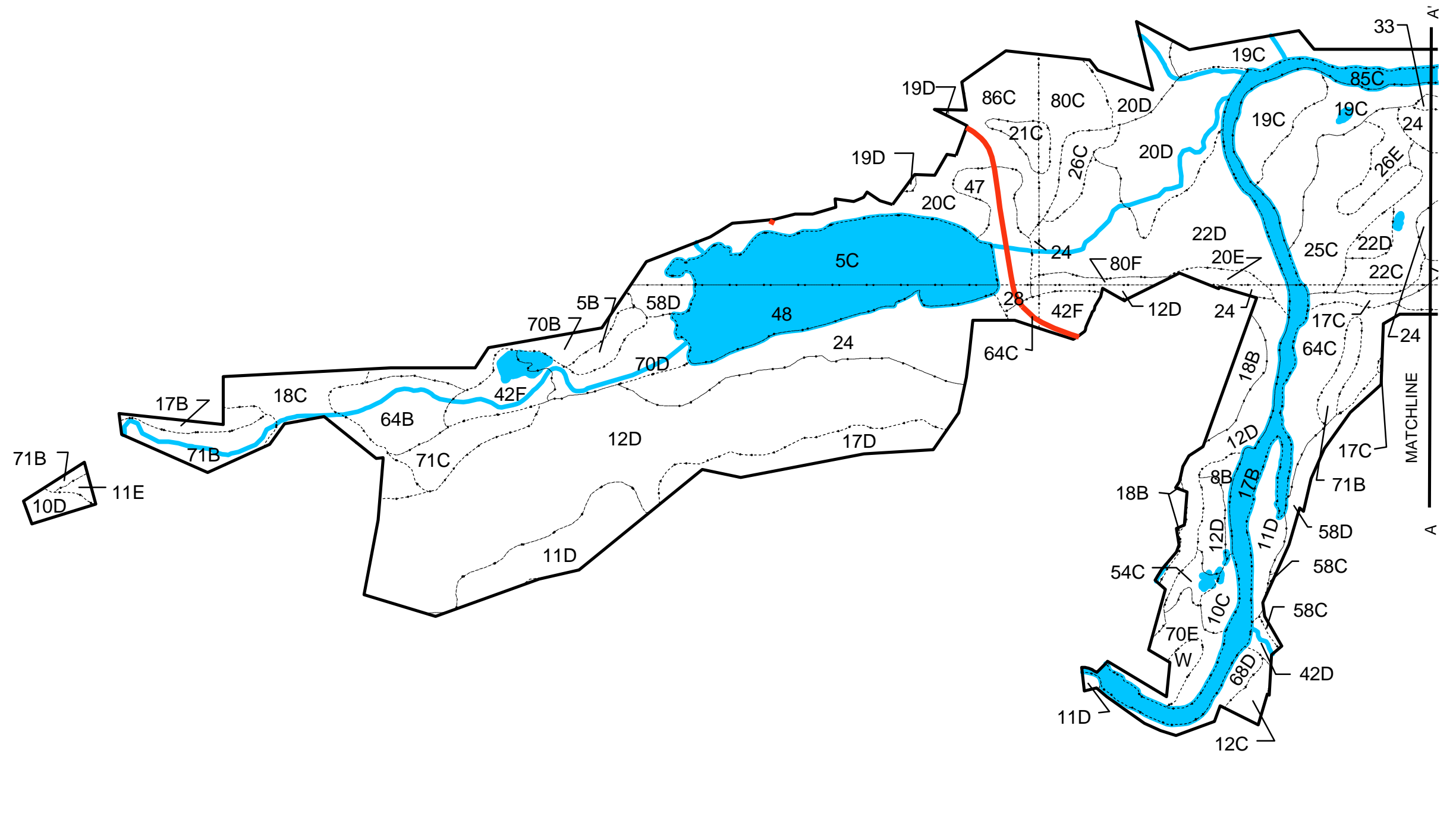
- 1. Soil classification data obtained from the Vermont GIS project web site.
- 2. Refer to Table XX for soil classification descriptions.
- 3. Data displayed is for illustrative purposes only.



 US Army Corps of Engineers® New England District	DRAFT FIGURE 3 PAGE 1 OF 2
	SOIL CLASSIFICATION PLAN NORTH SPRINGFIELD LAKE U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT SPRINGFIELD AND WEATHERSFIELD, VERMONT
	NOVEMBER 2003

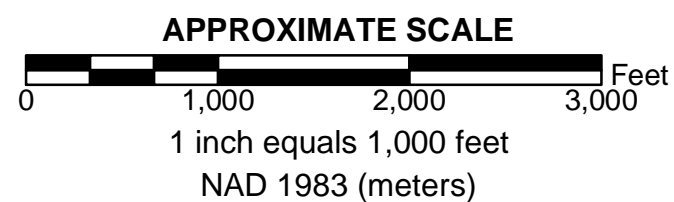
Legend

- Roads
- Project Boundary
- Streams and Brooks
- Soil Classification
- Rivers and Lakes
- Dam



NOTES:

1. Soil classification data obtained from the Vermont GIS project web site.
2. Refer to Table XX for soil classification descriptions.
3. Data displayed is for illustrative purposes only.



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New England District

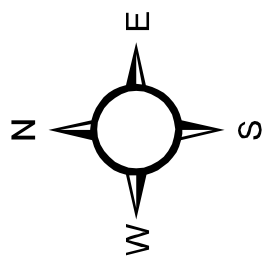
DRAFT FIGURE 3 PAGE 2 OF 2

SOIL CLASSIFICATION PLAN
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003



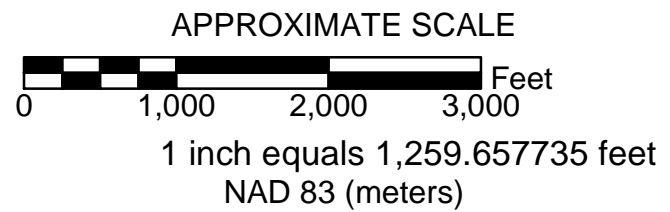
Legend


- Project Boundaries
- - - Town Line
- Matchline
- Roads
- Dam
- Wetland Classification
e.g. Palustrine Scrub Shrub
- Upland



NOTES:

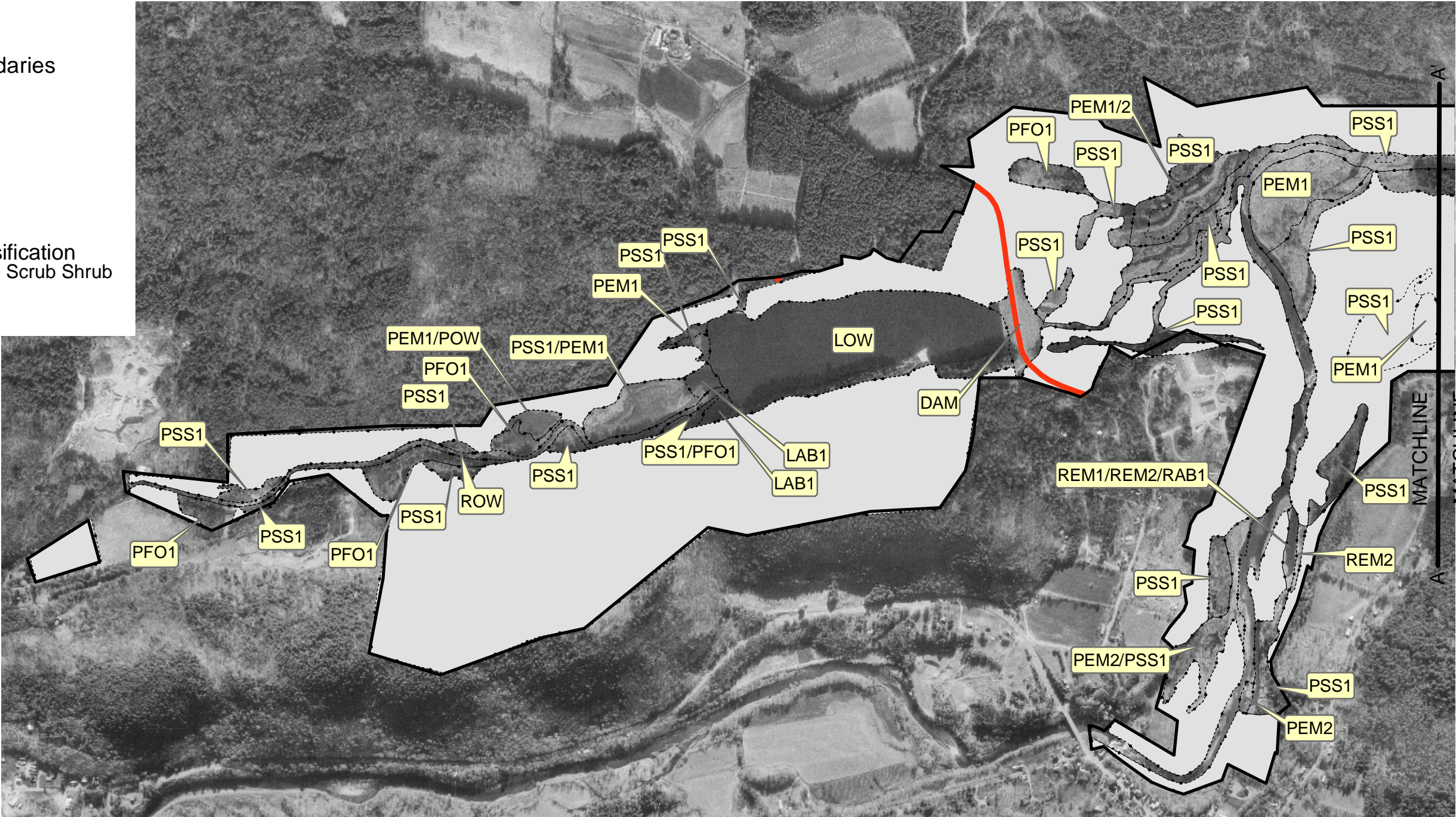
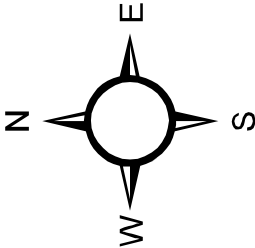
1. Wetland classification and boundary data obtained from "Wetland Map, Upper Connecticut River Basin, North Springfield Lake," prepared by the Army Corps of Engineers, New England District, Concord, Massachusetts.
2. Shaded areas are considered upland. Refer to Table XX for a description of wetland classifications.
3. Refer to Site Plan for additional notes and legends.



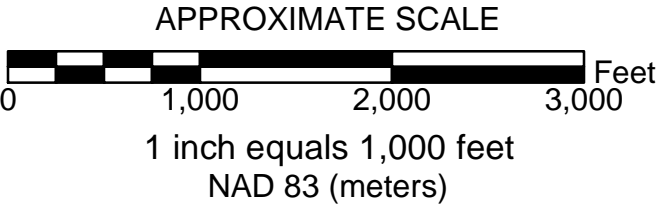
 US Army Corps of Engineers® New England District	DRAFT FIGURE 4 PAGE 1 OF 2	
	WETLAND CLASSIFICATION PLAN NORTH SPRINGFIELD LAKE U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT SPRINGFIELD AND WEATHERSFIELD, VERMONT	
	NOVEMBER 2003	


Legend

- Project Boundaries
- Town Line
- Matchline
- Roads
- Dam
- Wetland Classification
e.g. Palustrine Scrub Shrub
- Upland



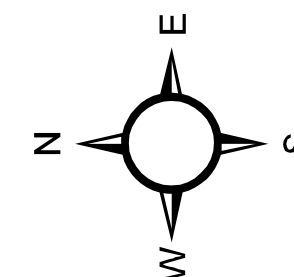
- NOTES:
- 1. Wetland classification and boundary data obtained from "Wetland Map, Upper Connecticut River Basin, North Springfield Lake," prepared by the Army Corps of Engineers, New England District, Concord, Massachusetts.
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 US Army Corps of Engineers® New England District	DRAFT FIGURE 4 PAGE 2 OF 2	
	WETLAND CLASSIFICATION PLAN NORTH SPRINGFIELD LAKE U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT SPRINGFIELD AND WEATHERSFIELD, VERMONT	
	NOVEMBER 2003	



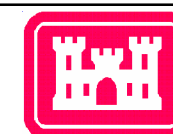
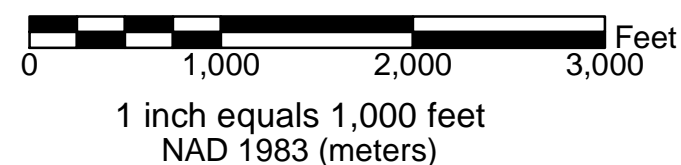
- ### Legend
- Project Boundary
 - Town Line
 - Matchline
 - Roads
 - Forest Cover
 - Dam



NOTES:

1. Forest cover data obtained from 'North Springfield Lake, North Springfield, Vermont; Forest Management Plan, Master Plan Appendix B" by the Department of the Army, New England Division, Corps of Engineers; January 1979.
2. Areas not labeled are considered open to brushy areas or an applicable cover type could not be determined.
3. Refer to Site Plan for additional notes and legends.

APPROXIMATE SCALE




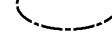



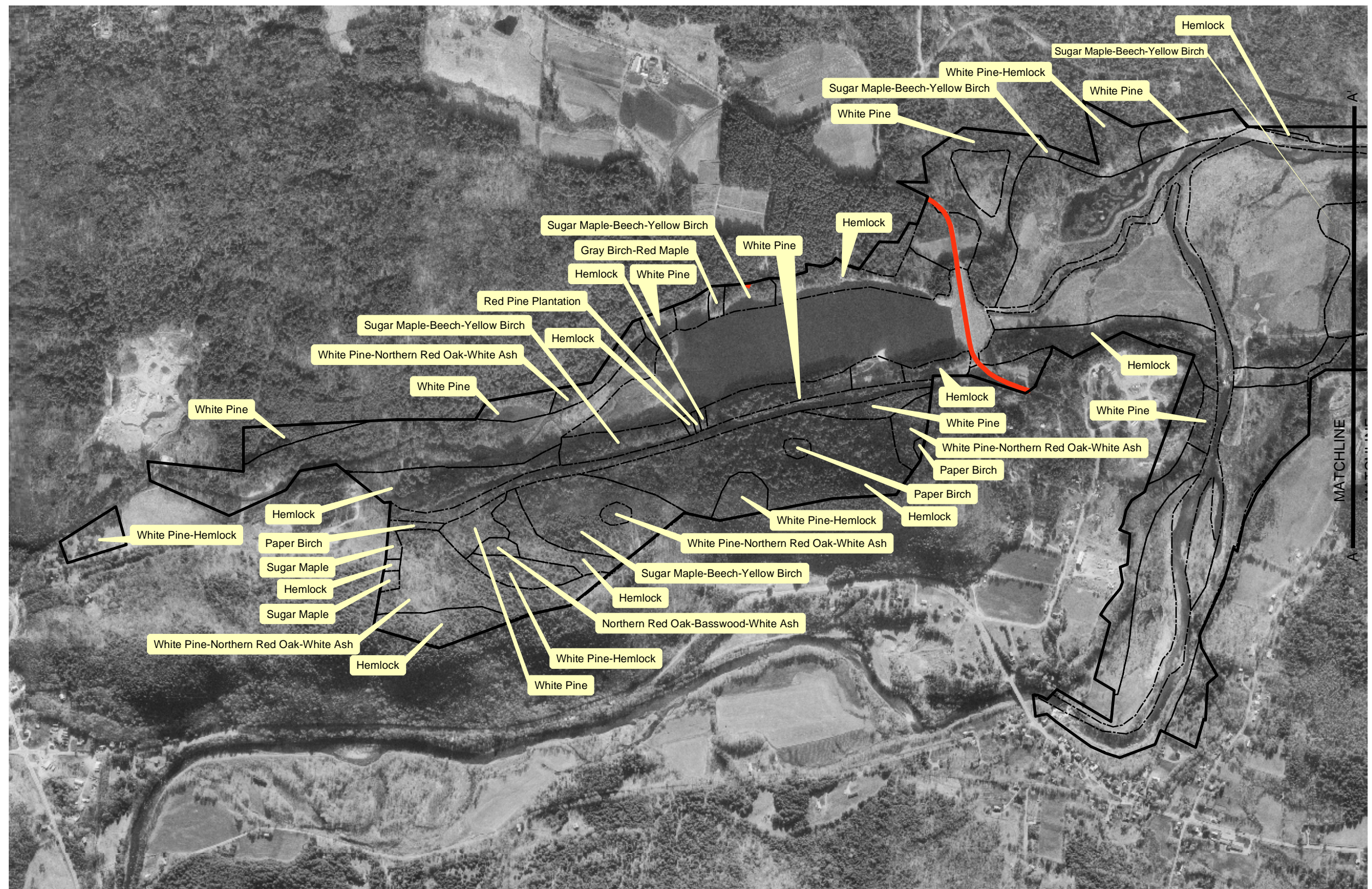
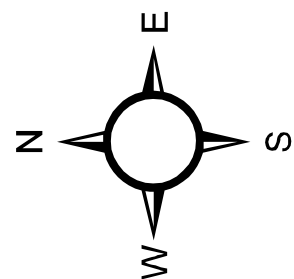
**US Army Corps
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New England District

DRAFT FIGURE 5 PAGE 1 OF 2

FOREST CLASSIFICATION PLAN
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003

Legend

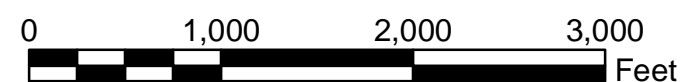
-  Project Boundary
-  Town Line
-  Matchline
-  Roads
-  Forest Cover
-  Dam



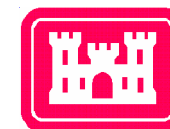
NOTES:

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2. Areas not labeled are considered open to brushy areas or an applicable cover type could not be determined.
2. Refer to Site Plan for additional notes and legends.

APPROXIMATE SCALE



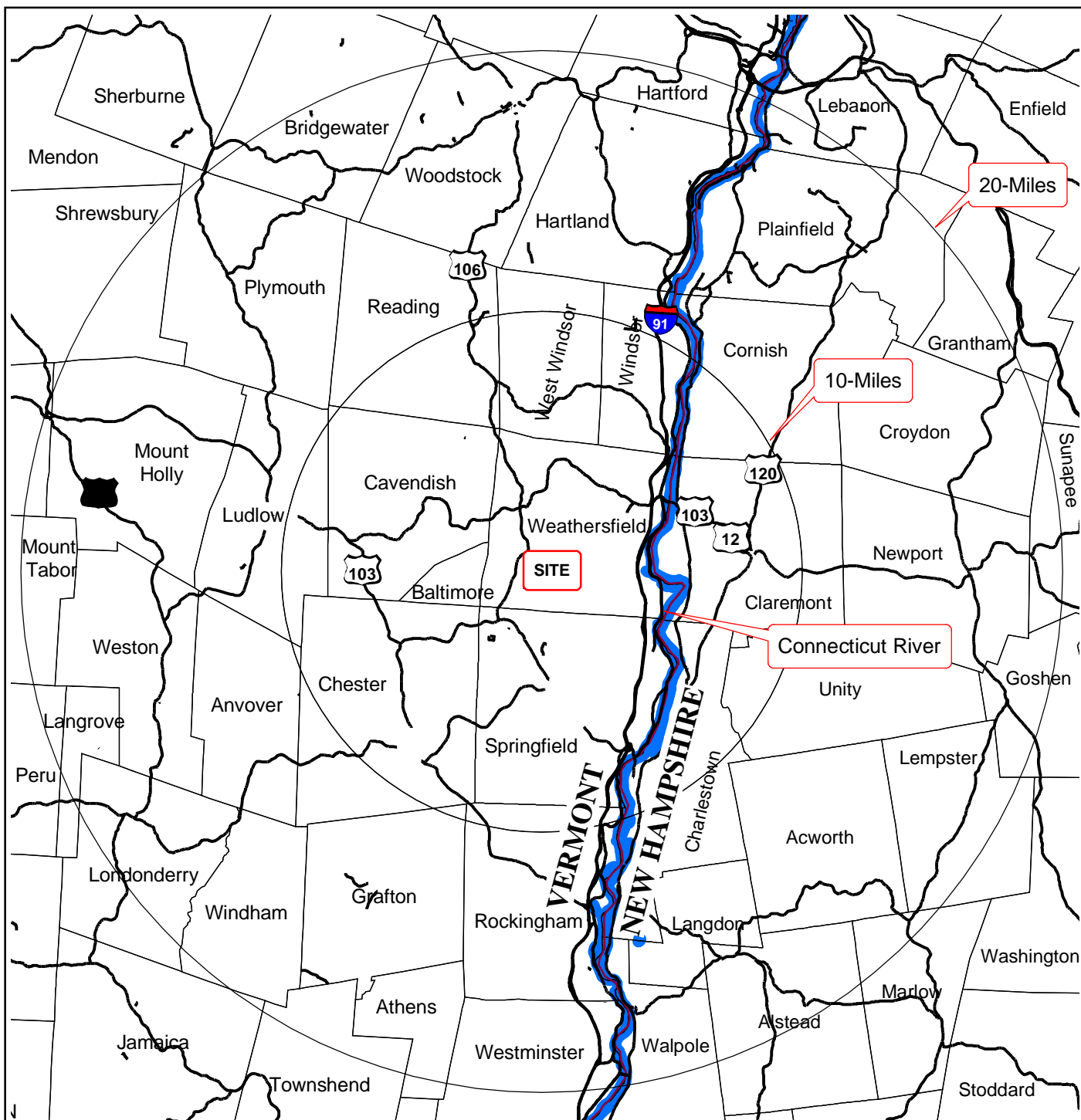
1 inch equals 1,000 feet
NAD 1983 (meters)



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New England District

DRAFT FIGURE 5 PAGE 2 OF 2

FOREST CLASSIFICATION PLAN
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003



NOTES:

1. State and town boundaries and transportation data were obtained from the Vermont GIS project and from the Complex Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire.



APPROXIMATE SCALE

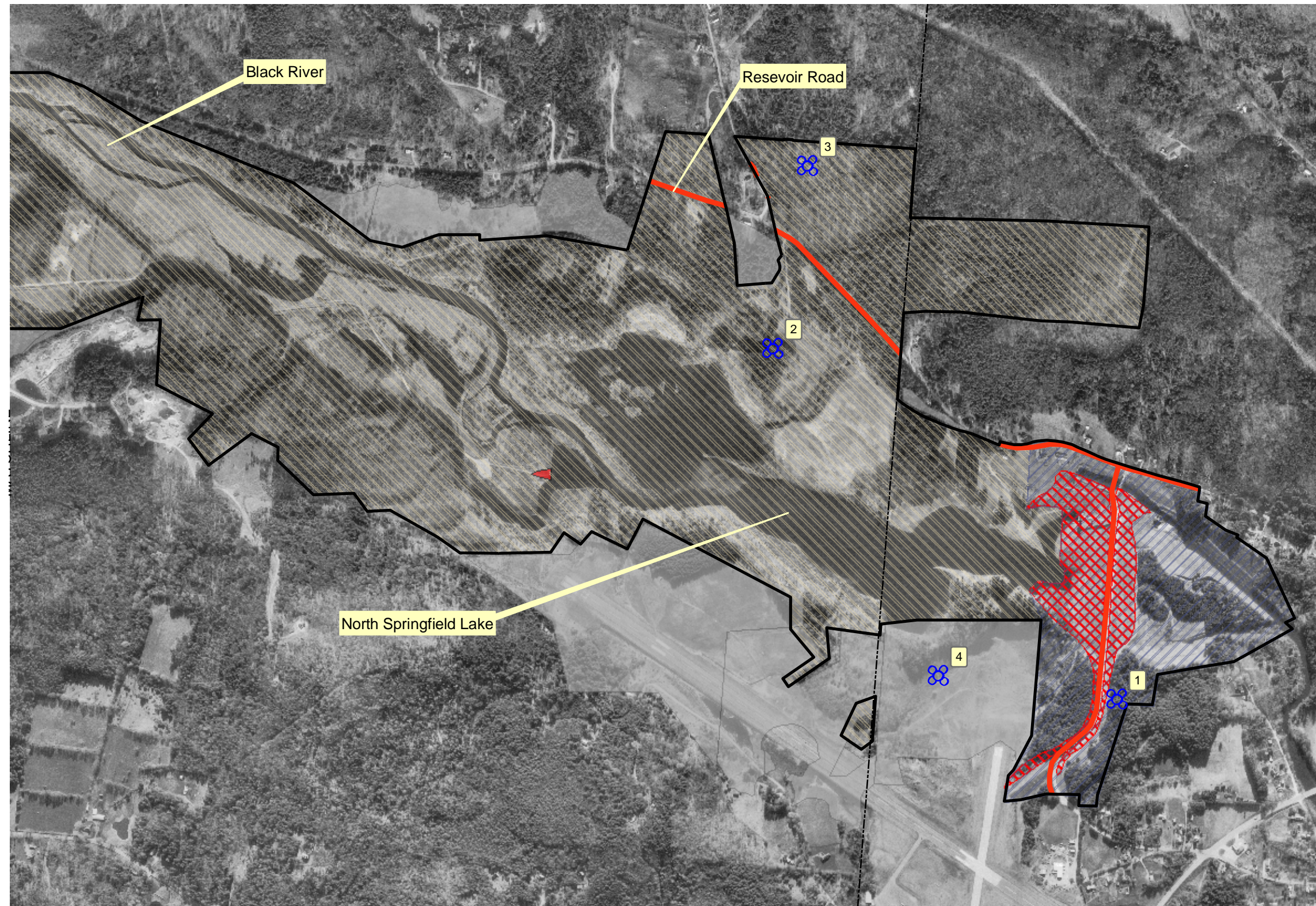
1 inch equals 30,000 feet



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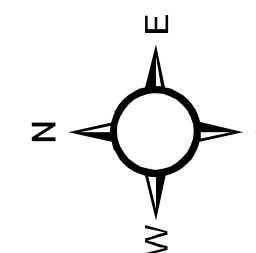


DRAFT FIGURE 6
MARKET AREA PLAN
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003



Legend

- Environmentally Sensitive Area
- Project Boundaries
- Town Line
- Matchline
- Roads
- Dam
- Easement
- Multiple Resource Management Area
- Project Operations Flood Control Facility
- Recreation Area

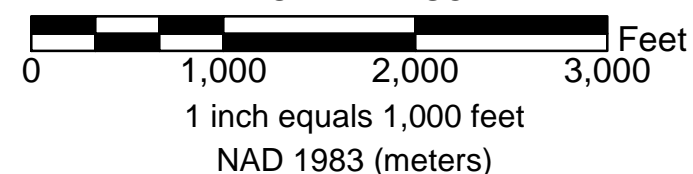


NOTES:

1. Recreation facility data was obtained from "Project Plan for Recreation Resources Development, North Springfield Lake, Springfield and Weathersfield, Vermont," prepared by U.S. Army Corps of Engineers, New England Division, dated 1981. Water body data were obtained from the Vermont GIS project.

2. Data displayed is for illustrative purposes only.

APPROXIMATE SCALE














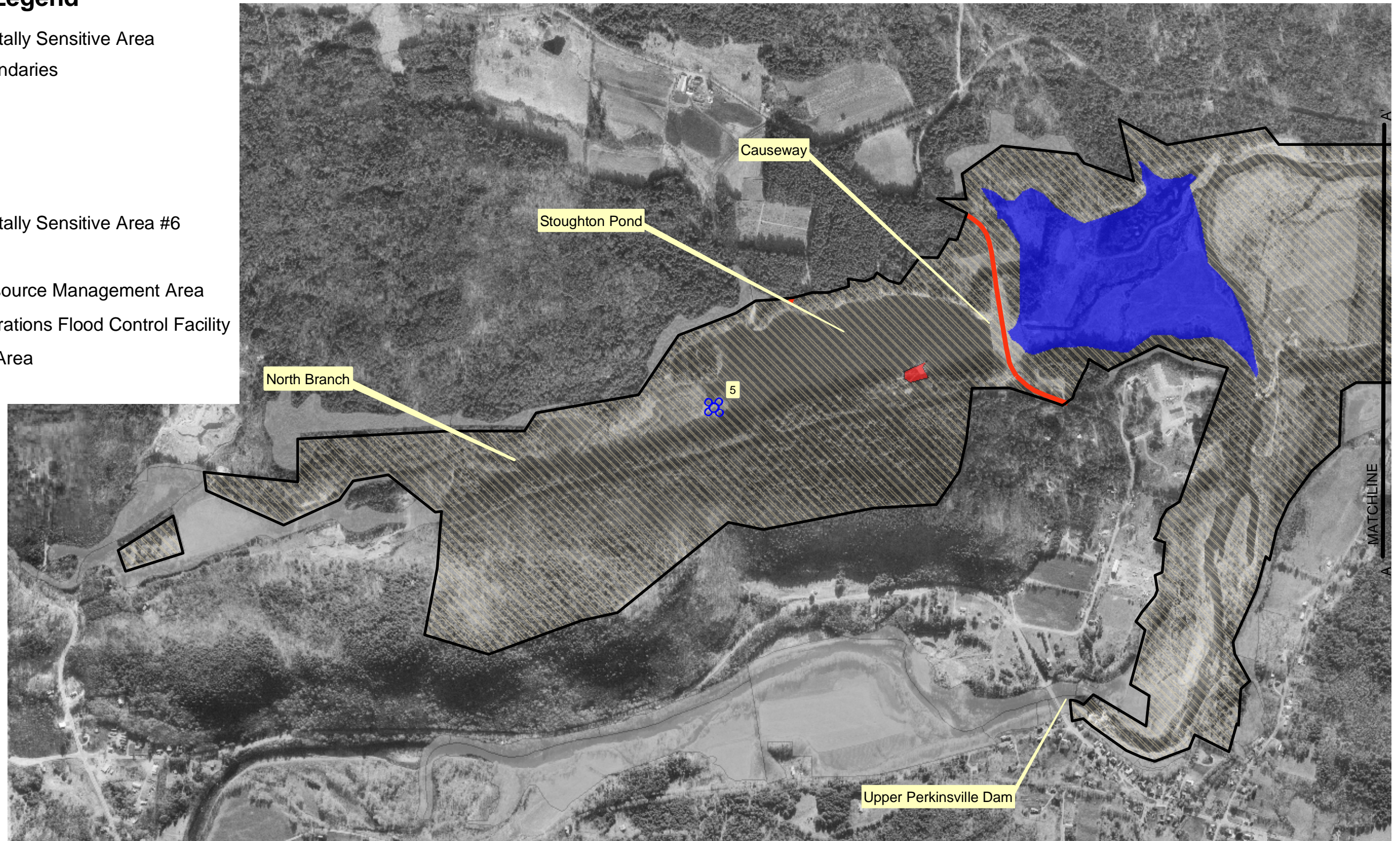
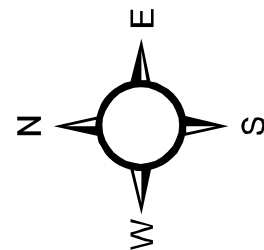
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DRAFT FIGURE 7 PAGE 1 OF 2

LAND CLASSIFICATION
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003

Legend

-  Environmentally Sensitive Area
-  Project Boundaries
-  Town Line
-  Matchline
-  Roads
-  Dam
-  Environmentally Sensitive Area #6
-  Easement
-  Multiple Resource Management Area
-  Project Operations Flood Control Facility
-  Recreation Area

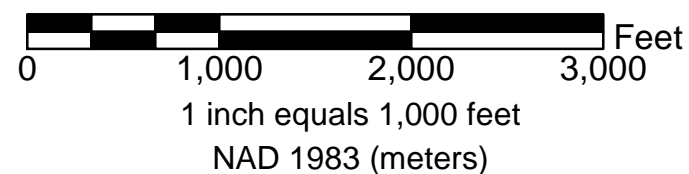


NOTES:

1. Recreation facility data was obtained from "Project Plan for Recreation Resources Development, North Springfield Lake, Springfield and Weathersfield, Vermont," prepared by U.S. Army Corps of Engineers, New England Division, dated 1981. Water body data were obtained from the Vermont GIS project.

2. Data displayed is for illustrative purposes only.

APPROXIMATE SCALE



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DRAFT FIGURE 7 PAGE 2 OF 2

LAND CLASSIFICATION
NORTH SPRINGFIELD LAKE
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
SPRINGFIELD AND WEATHERSFIELD, VERMONT
NOVEMBER 2003

DRAFT - MASTER PLAN

**APPENDIX A
PUBLIC COORDINATION MAILING LIST**

North Springfield Lake
Springfield and Weathersfield, Vermont

DRAFT - MASTER PLAN

**APPENDIX A
PUBLIC COORDINATION MAILING LIST
North Springfield Lake Dam
Springfield and Weathersfield, Vermont**

Honorable John F. Campbell Vermont Senate PO Box 1306 Quechee, Vermont 05059	Honorable John Follett Vermont House of Representatives 266 Barlow Street Springfield, Vermont 05633	Mr. Conrad Motyka, Commissioner Department of Forests, Parks & Recreation Vermont Agency of Natural Resources 10 South, 103 South Main Street Waterbury, Vermont 05671-0501	Mr. Forest Hammond District Wildlife Biologist Department of Fish & Wildlife Vermont Agency of Natural Resources, Mineral Street Springfield, Vermont 05156
Honorable Richard J. McCormack Vermont Senate RR2 Box 124 Bethel, Vermont 05032	Honorable Don Davis Vermont House of Representatives 20 Chubb Hill Road Cavendish, Vermont 05142	Mr. Nathan McKeen Regional Manager - Region I Department of Forests, Parks & Recreation Vermont Agency of Natural Resources R.F.D. Box 33 North Springfield, Vermont 05150	Ms. Kimberly Royar District Wildlife Biologist Department of Fish & Wildlife Vermont Agency of Natural Resources, Mineral Street Springfield, Vermont 05156
Honorable Peter Welch Vermont Senate PO Box 858 White River Junction, Vermont 05001	Honorable Carolyn Partridge Vermont House of Representatives RFD Box 192 South Windham, Vermont 05359	Mr. Ronald Regan, Commissioner Department of Fish & Wildlife Vermont Agency of Natural Resources 10 South, 103 South Main Street Waterbury, Vermont 05671-0501	Mr. Jay Maciejowski District Forest Manager Department of Forests, Parks & Recreation Vermont Agency of Natural Resources, Mineral Street Springfield, Vermont 05156

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APPENDIX A
PUBLIC COORDINATION MAILING LIST
North Springfield Lake Dam
Springfield and Weathersfield, Vermont

Honorable Alice Emmons Vermont House of Representatives 318 Summer Street Springfield, Vermont 05156	Honorable Michael Obuchowski Vermont House of Representatives 72 Atkinson Street Bellows Falls, Vermont 05101- 1321	Mr. Ken Cox Fisheries Biologist Department of Fish & Wildlife Vermont Agency of Natural Resources Mineral Street Springfield, Vermont 05156	Mr. Roy Burton State Lands Forester Department of Forests, Parks & Recreation, Vermont Agency of Natural Resources Mineral Street Springfield, Vermont 05156
Mr. Jon Bouton Windsor County State Forester 6 Gilman Office Complex White River Junction, Vermont 05001	Mr. Laurence J. Melen Weathersfield Town Manager PO Box 550 Ascutney, Vermont 05030	Ms. Sharon Francis Executive Director Connecticut River Joint Commissions Post Office Box 1182 Charlestown, NH 03603	Mr. Mike Bartlett U.S. Fish & Wildlife Service New England Field Office 70 Commercial Street, Suite 300 Concord, New Hampshire 03301-5087
Mr. Phil Howland Game Warden Vermont Agency of Natural Resources Mineral Street Springfield, Vermont 05156	Mr. Robert Forguites Springfield Town Manager 96 Main Street Springfield, Vermont 05156	Mr. Dan Maxon Water Quality Division Vermont Department of Environmental Conservation Building 10 North 103 South Main Street Waterbury, Vermont 05671	Ms. Tara Bamford Upper Valley Lake Sunapee Regional Planning Commission 77 Bank Street Lebanon, New Hampshire 03766-1704

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**APPENDIX A
PUBLIC COORDINATION MAILING LIST
North Springfield Lake Dam
Springfield and Weathersfield, Vermont**

Mr. George Lowe Director of Emergency Management Department of Public Safety Emergency Management Division 103 South Main Street Waterbury, Vermont 05671	Ms. Flo-Ann Dango Weathersfield Town Clerk PO Box 550 Ascutney, Vermont 05030	Mr. Dana Young, District Conservationist Ottauquechee Conservation District Natural Resources Conservation Service 12 Gilman Office Complex, Suite 2 White River Junction, VT 05001	Mr. Peter Daniels Chairperson, Planning Commission PO Box 275 Ascutney, Vermont 05030
Ms. Debra A. Craigue PO Box 412 34 School Street North Springfield, Vermont 05150	Ms. Jan Lambert 335 Sam Putnam Road Charlestown, New Hampshire 03603	Ms. Eleanor Ellis 2403 reservoir Road Weathersfield, Vermont 05151	Mr. Wally Elton 69 Elm Hill Street Springfield, Vermont 05156
Mr. John LaBelle 13 Third Street Newport, New Hampshire 03773	Mr. Alex Greer 208 Asrport Road N. Springfield, Vermont 05150	Mr. John Bond 232 Will Dean Road Springfield, Vermont 05156	Mr. Mike Jenzen 88 Dan Jarvis Road Springfield, Vermont 05156
Mr. Stephene. Belletsky, Jr. HC60 Box 43 Charlestown, New Hampshire 03603	Mr. Roger Marshall 205 Connecticut River Road Springfield, Vermont 05156- 9178	Mr. Michael Keeley Butterfield Hill Road (Box 248) Perkinsville, Vermont 05151	Mr. Allen Woods 11 Cemetery Road N. Springfield, Vermont 05150

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**APPENDIX A
PUBLIC COORDINATION MAILING LIST
North Springfield Lake Dam
Springfield and Weathersfield, Vermont**

Mr. Kurt W. Forauer 85 Route 12 Hartland, Vermont 05048	Mr. John P. Wyatt PO Box 64 N. Springfield, Vermont 05150	Mr. Dan O'Donnell 31 Reservoir Road Springfield, Vermont 05156	Mr. Laurence J. Melen P.O. Box 550 Ascutney, Vermont 05030-0550
Mr. Patrick Libby PO Box 494 Ascutney, Vermont 05030	Mr. John E. Keefe 205 Butterfield Perkinsville, Vermont 05151	Ms. Gabriella Hall 31 Reservoir Road Springfield, Vermont 05156	Mr. Brian T. Fitzgerald Vermont Agency of Natural Resources 103 South Moan Street, 10 North Waterbury, Vermont 05671-0408
Mr. Robert G. Paquin Legislative Assistant United States Senator Patrick Leahy Box 933 Federal Building Montpelier, Vermont 05601	Ms. Giovanna Peebles, State Archaeologist Vermont Division for Historic Preservation National Life Building, Drawer 20 Montpelier, VT 05620-0501	Mr. Dean Corren Natural Resources Coordinator US Representative Bernard Sanders 1 Church Street Burlington, Vermont 05401-4451	
Mr. Brian Keefe Natural Resources Coordinator United States Senator James Jeffords 2 South Main Street Rutland, Vermont 05701	Honorable James Douglas Governor of the State of Vermont State Capitol Montpelier, Vermont 05602		